

# Microcredit, Income Assistance, and Households' Time Allocation to Self-employment

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By

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## Abstract

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Microcredit, Income Assistance, and Households' Time Allocation to Self-employment

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This study develops a model to explain why some households in the United States and Canada opt for microcredit (MC) that seems to decrease their utilities in the short term. Some microcredit participants allocate time to less-productive microenterprises rather than engage in paid work. The role of sequential lending is examined in understanding household participation in microcredit programs. Sequential lending means that a household's current use of microcredit gives it access to greater funds in the future.

Under a multi-period model, the effect of current use of microcredit on future utilities is captured. To keep the analysis simple, households are assumed to live in two periods — the present and the future. The model acknowledges that households are heterogeneous with respect to their relative preference for income and leisure. Two types of households are assumed. The type-1 household has a high relative preference for income: the type-2 household has a high relative preference for leisure.

Each household has a reservation utility, — the utility it would derive if it self-selected out of the microcredit program. The reservation utility derives from leisure and paid earnings (as well as from income assistance benefits in the case of income assistance recipients). Each household also faces a utility from self-selecting into the microcredit program. The microcredit is small, thus the current period utility from participating in the MC program may be less than the current period reservation utility. But with sequential lending, a current period participant will have access to a larger loan in the future and utility with that loan may increase beyond the reservation utility. Each household self-selects into the microcredit program only if the net present value of its anticipated utility with microcredit exceeds the net present value of its reservation utility.

A household's likelihood of self-selecting into the microcredit program is an increasing function of its discount factor, its productivity in self-employment, and the size of

future loans anticipated from current borrowing. On the other hand the likelihood of self-selecting into the microcredit program is a decreasing function of the cost of borrowing and the household's wage rate in paid employment. One of the interesting results of the model is that some households — in a bid to access the future loan — may obtain microcredit in the current period and repay it without having invested it in a microenterprise.

The developed model is applied in explaining microcredit participation among income assistance (IA) recipients. IA recipients facing a 100% earnings tax rate will not allocate time to paid work because their entire earnings would be clawed back from the guaranteed benefit leaving no change in total income. If the household obtains microcredit and allocates time to a microenterprise, its utility would decrease because leisure would decrease and total income would not change under the 100% earnings tax rate. However, in the future period, the household would get a larger loan by virtue of past participation in the microcredit program. The loan could be large enough to generate profits beyond the IA eligibility point, in which case the household would break away from IA, total income would increase, and utility could increase to the point of offsetting any utility loss incurred in the preceding period. Therefore, an IA recipient facing a 100% earnings tax rate may obtain microcredit and allocate time to a microenterprise in order to access a larger capital in future, in anticipation of breaking away from the IA program.

The analyses of time allocation among income assistance recipients produced a set of equations for comparing between the marginal effects of income assistance and microcredit on households incomes and utilities. This comparison is at the heart of ongoing proposals to replace income assistance with microcredit in a bid to reduce public spending on IA while encouraging IA recipients to work. Based on the marginal effects of IA and MC, this study prescribes the minimum rates of substituting microcredit for income assistance in order to ensure that affected households do not experience a short-fall in their incomes and utilities. The prescribed minimum rate is a positive function of the earnings tax rate in the prevailing IA program, and a negative function of the household's preference for leisure, as well as its marginal value product of capital.

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# Chapter 1

## Introduction

### 1.1 Background

Poverty and the alleviation of poverty have emerged as important public policy issues in Canada and the United States during the 20th century (Lichter, 1997; Rank and Hirschl, 1999; Osberg, 2000; Finnie and Sweetman, 2003). Since the Great Depression in the 1930s, governments in both countries have introduced legislation to improve the economic conditions of poor households. For instance, in 1933, President Franklin Roosevelt of the United States commissioned the Federal Emergency Relief Administration to give both cash relief and work relief to unemployed households so as to mitigate the effects of the Depression (Hopkins, 1999).<sup>1</sup> Two years later, U.S. Congress passed the Social Security Act of 1935 which introduced Aid to Families with Dependent Children (AFDC).<sup>2</sup>

The concern for poor households was re-emphasized by U.S. President Lyndon Johnson in his 1964 declaration of “war on poverty”. The declaration preceded the passage by Congress, of the Economic Opportunity Act of 1964 to provide work, training, education, and technical assistance to young men and women from impoverished homes (Boone, 1972; Andrews, 2001). Programs established under the Economic Opportunity Act coexisted alongside the AFDC.

In Canada, attempts to fight poverty resulted in the Unemployment Assistance Act of 1956. Under the act, the federal government matched provincial benefit payment to employable persons who were unemployed (Osborne, 1985; Moscovitch, 1988). The act was subsequently replaced in 1966 by the Canada Assistance Plan (CAP) which retained the federal matching formula for income assistance spending by each province (Allen, 1993; Lemieux and Milligan, 2008; Barrett and Cragg, 1998; Hum and Simpson, 1993;

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<sup>1</sup>Adoption of the relief program at the federal level followed a 1931 adoption of similar program by the city of New York (Hopkins, 1999).

<sup>2</sup>Upon inception the AFDC was called the Aid to Dependent Children (ADC) but was subsequently renamed as Aid to Families with Dependent Children.

2001).

The Income Assistance (IA) policies of both the United States and Canada have since undergone reforms to pave way for the present day IA programs (Greenberg, 2002; Brzozowski, 2007; Caputo, 2009; Frech, 2009; LeMire, 2008; Kneebone and White, 2009). The reforms have been driven, as well as accompanied by debates in political and academic circles. Two major objections have been raised against the programs. The first is based on their expenditure burden on society. The second is based on the disincentive for work that is created by the payment of benefits to low-income households (Moffitt, 1992; Hum and Simpson, 1993; 2001).

The present day IA program in the United States is known as Temporary Assistance for Needy Families (TANF). As of March 2010, the TANF caseload stood at 1.83 million families covering 4.3 million recipients (*U.S. Department of Health and Human Services: Administration for Children and Families*). Canada's IA caseload in March 2008 was 600,000 families covering 1.3 million recipients.<sup>3</sup> Income Assistance programs are also known as Income Support, Welfare, or Social Assistance, depending on the jurisdiction.

As a more recent alternative in the fight against poverty, microcredit has been introduced in Canada and the United States. The introduction was inspired by the reported success of microcredit programs as a measure to alleviate poverty in developing countries (Frankiewicz, 2001), and by a growing ideology of "Bootstrap Capitalism" (Servon, 1999).<sup>4</sup> Bootstrap capitalists believe that low-income households, when provided with capital can "pull themselves up by their bootstraps" — by becoming entrepreneurial and self-sufficient — rather than rely on income assistance (Sherraden, 1991; Stoesz, 2007; Isserles, 2003). Microcredit programs extend business loans to low-income households who, for lack of collateral securities, are unable to access conventional sources of business loans. The loans are often very small in size and require repayment in installments over a specified period of time. Eligibility for the loans is based on a household's ability to demonstrate its intention to invest the credit in some income-generating activity.

The earliest microcredit programs in Canada and the United States were introduced in the 1980s and funded mainly by non-governmental organizations (Conlin, 1999; Frankiewicz, 2001; Pickering and Mushinski, 2001; Zephyr, 2004). The early programs targeted low-income households with business loans of between \$500 and \$5,000. Their lending method-

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<sup>3</sup>These figures were calculated from Social Assistance Statistical Report: 2008 (see HRSDC (2010)).

<sup>4</sup>Studies that have reported the success of microcredit programs in developing countries include Khandker et al., 1998; Amin et al., 1998; Morduch, 1998; Zaman, 1999; McKernan, 2002; Chavan and Ramakumar, 2002; and Mahmud, 2003. However, there are some dissenting voices regarding the impact of these programs, particularly on the empowerment of women (Rahman, 1999; Isserles, 2003).

ology was fashioned after the group lending model used in developing countries.<sup>5</sup> Many of the early programs in Canada and the United States were ultimately unsuccessful owing partly to a small client base and a high rate of loan default, as well as the ineffectiveness of the group lending model in the United States and Canada (Frankiewicz, 2001; Taub, 1998; Zephyr, 2004).

That notwithstanding, attempts at adapting microcredit programs to the United States and Canada is still ongoing. Today, only a few MC programs use the group lending technique while the vast majority deliver loans on an individual basis. Additionally, the range of loan sizes offered by the program has increased, with some programs offering up to \$35,000. As of 2008, there were at least 263 MC programs in the United States alone. The programs served a median of 200 and a mean of 416 borrowers. The total number of loans disbursed was 9,191 with a total value of over 100 million dollars (Girardo and Edgcomb, 2011; FIELD, 2010).

The demand for microcredit among low-income households in the United States and Canada has been driven partly by IA reforms, including the tightening of work requirements for IA recipients (Edgcomb and Klein, 2005). Loprest (2001) estimates that 6.8% of households who leave income assistance programs get self-employed in a microenterprise. The number of participants in today's microcredit programs is still considered small in relation to the size of the potential market. Edgcomb and Klein (2005) estimate that the potential market for microcredit in the United States is 10 million individuals, out of which 140,000 are IA recipients who would become self-employed.

## **1.2 Problem Statement**

Although microcredit programs have been introduced as a way of increasing the earnings of the poor, little is known about the impact of these programs on the earnings of participants in the United States and Canada. Available reports are mostly descriptive and the majority have been commissioned by program practitioners rather than by independent analysts (Klein et al., 2003; Clark and Kays, 1999; Himes and Servon, 1998; Black, 2004; Burrus, 2005; Frankiewicz, 2001; Wehrell, 2002). These studies have concluded that households who participate in the MC program experience an increase in earnings.

Sanders (2002) is perhaps the only study of the impact of microcredit programs that uses an experimental design including a control group. The paper compared the income

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<sup>5</sup>Under the group lending model, prospective borrowers are required to form groups of four to eight members who agree to be jointly liable for one another's loan. Joint liability ensures a high repayment rate for microcredit programs in developing countries (Ghatak, 2000; Stiglitz, 1990).

growth of participants of seven U.S. microcredit programs with the income growth of eligible nonparticipants over a four-year period (1991 to 1995). The paper concluded that the microcredit programs do not seem to have a significant positive effect on the incomes of participants. In a different study of U.S. microcredit participants, Spalter-Roth et al. (1994) observed that low-income households combining wage work with self-employment had lower per hour earnings from their microenterprises than they did from their wage work.

A decrease in earnings has also been reported among some microcredit participants in Canada. Citing an unpublished work by Eric Santor and Rafael Gomez who were then PhD students at the University of Toronto, Frankiewicz, 2001 (P. 37) states, “Santor and Gomez also expressed concern that, despite improvements in the average borrower’s situation, Metrofund’s [microcredit] loans appeared to leave many borrowers worse off. They found that roughly one-third of all borrowers reported lower profits and business revenue after receiving a loan...”

The question of whether microcredit leads to increased earnings is a complex one. From the interviews carried out early on in this research, it was learned that for a number of the borrowers, the profits from their microenterprise were not sufficient to repay the loan (for details on the interviews, see Chapter 3). Nevertheless, these borrowers were willing to remain as participants in the microcredit program.

The traditional model of household time allocation between wage work and self-employment does not explain the time allocation decisions of households for which microcredit participation results in a decrease in earnings. The traditional model as developed by Becker (1965) and later made popular by Gronau (1977) suggests that these households should *ex ante* self-select out of the MC program and instead allocate time to the more productive wage jobs. This is in contrast to the observations made of Vancity’s microcredit borrowers.

Additionally, while existing theory suggests that IA recipients facing a 100% earnings tax rate would allocate all their time to leisure (Moffitt, 1992; 2003; Danziger et al., 1981), some such households have actually participated in microcredit programs, allocating time to a microenterprise and having all their earnings clawed back from their IA benefits. The interview sample of seven borrowers in Vancity’s microcredit program included three respondents who were recipients of British Columbia’s IA program at the time of joining the microcredit program. The BC Income Assistance (BCIA) program applies a 100% earnings tax rate to the benefits payable to eligible recipients. Therefore, although microcredit participation could increase the earnings of the IA recipient, the effect on the

household's total income would be zero because the entire earnings are clawed back from the IA benefit. Below is one respondent's comment regarding the impact of participation in the microcredit program that, in her opinion, increased her earnings but did not increase her total income.

....[my friends] think I am poor, I am wasting my time....because you know, they say that I am still at the same spot that I was before. Same spot means; I don't have - I can't travel, I don't have maybe nice beautiful clothes, I don't have money. You know when somebody have money? And I work seven days a week. You know what I am talking about, I am still living in the housing - low rent. But everybody is different. At least I have to do something, I have to work, I am not going to sit back and be on welfare [income assistance].

For the above quoted IA recipient, the work disincentive of a 100% earning tax rate was not enough to discourage time allocation to a microenterprise as suggested by the existing theory. A review of the loan application forms of thirty first-time applicants to Vancity's microcredit program revealed that eleven applicants were BCIA recipients. Further, a review of 94 loan application forms of returning borrowers in the microcredit program, revealed that 36 households were participants in the BC Income Assistance (BCIA) program as well as self-employed on the microenterprise they had set up with an earlier borrowed microcredit.

The gap between time allocation as observed among microcredit borrowers and time allocation as suggested by the traditional model can be explained by the sequential lending attribute of microcredit. Whereas the basic model of household time allocation to work assumes a single-period utility maximization problem, the sequential lending attribute of microcredit suggests that a multi-period analysis is more appropriate in understanding households' time allocation to microcredit. Under the sequential lending arrangement of microcredit programs, a first time applicant is approved for only a small loan, which upon successful repayment qualifies him or her for a larger loan (Servon and Bates, 1998). In addition, microcredit programs provide households with opportunities to build good credit histories by successfully borrowing and repaying small loans. With such credit histories, the households may in the future be able to access larger sums of business capital from traditional sources of credit. A multi-period model would capture the future-period effects of current-period participation in the microcredit program.

The objectives of this dissertation are, (1) to develop a two-period model in explaining time allocation by households who are eligible for microcredit in the United States and Canada, and (2) to apply the model in explaining self-selection into microcredit programs



among income assistance recipients who face a 100% earnings tax rate on the IA program. The effects of household-specific variables such as the relative preference for work, microenterprise productivity, and time preference rate are considered. Also considered are the effects of specific variables on the MC programs (such as the interest rates and the size of the next loan that can be accessed by virtue of current participation). For income assistance recipients, the effects of specific variables on the IA programs (such as the amount of the basic benefits and the duration of assistance) are considered as well. Resulting equations are used to compare the marginal effects of microcredit and income assistance on household incomes, as well as utilities. The comparisons give estimates of the minimum rate of substituting microcredit for income assistance without causing a decrease in households' total incomes and utility.

### **1.3 Organization of Thesis**

This rest of this dissertation is organized as follows. Chapter 2 gives an overview of microcredit and income assistance programs in Canada and the United States. Chapter 3 presents data from Vancity's microcredit program as evidence of strategic borrowing and earnings decrease among microcredit participants. Chapter 4 develops a model of time allocation to a microenterprise by a household who lives in a current as well as a future period. The model is in two parts. The first part explores time allocation (and utility maximization) in a given period conditional on the household having self-selected into the microcredit program. The second part of the model considers the household's decision to self-select into the program as a problem of maximizing the net present value of its current and future period utilities. Chapter 5 applies the model developed in chapter 4 in explaining self-selection into microcredit programs among IA recipients. In chapter 6, the equations produced in analyzing the time allocation response of IA recipients are exploited in comparing the marginal effects of microcredit and income assistance on household incomes and on utilities. Chapter 7 concludes and discusses the policy implications of the findings.

## **Chapter 2**

# **An Overview of Microcredit and Income Assistance Programs in the United States and Canada**

## **2.1 Microcredit Programs**

At least 65 million borrowers have participated world wide since the introduction of microcredit programs in Bangladesh in 1976 (Armendariz de Aghion and Morduch, 2005). Interest in the programs has spread to other developing countries as well as to developed countries. In the words of a serving president of the World Bank, microcredit has “brought the vibrancy of the market economy to the poorest villages and people of the world...[and] allowed millions of individuals to work their way out of poverty with dignity” (cited by Williams, 2004, p.146). The United Nations’ declaration of the year 2005 as the “International Year of Microcredit” underscored the global recognition of the programs in the fight against poverty. The euphoria about microcredit has not gone unnoticed in the United States and Canada. Following is a brief discussion of the history and current state of microcredit in the two countries.

### **2.1.1 Microcredit Programs in Canada**

Canada’s first microcredit program was introduced by Calmeadow, a non profit organization headquartered in Toronto. Calmeadow was inspired by its partnership with microcredit organizations in the developing world to introduce the program to poor communities in Canada. In 1987, Calmeadow launched a pilot microcredit program, the Native Self-employment Loan Program (NSELP) in Wikwemikong, Kettle Point, and Sachigo Lake communities in Ontario (Frankiewicz, 2001). Following the success of the NSELP, Calmeadow created the First Peoples Fund (FPF) in 1990, with an objective to deliver microcredit to first nations communities across Canada.

Within the next four years, Calmeadow created three additional microcredit funds across

Canada: Partnership Assistance for Rural Development (PARC) was launched in Shelbourne Nova Scotia in 1991, Peer Assisted Lending (PAL) in Vancouver BC in 1992, and Metrofund in Toronto in 1994 (Frankiewicz, 2001). Between 1987 and 1999, the microcredit funds founded by Calmeadow across Canada delivered more than \$4.6 million in 2,558 loans (Frankiewicz, 2001). The average loan size was \$1,800.

The microcredit programs were initially designed after the peer lending model of the Grameen bank. Borrowers were required to form groups of four to ten and to assume responsibility for one another's loan. Joint liability meant that no member of the group would be able to access a next loan until the previous loans made to every member of the given group had been repaid. The thinking was that such joint liability would provide incentive for peer monitoring within the group and therefore ensure a low default rate on the program. However, the peer lending model proved to be ineffective in Canada, much like the experience with U.S. microcredit programs (Frankiewicz, 2001; Williams, 2004; Taub, 1998; Zephyr, 2004). By 1998, Calmeadow had introduced individual lending to run along side the group lending programs (Frankiewicz, 2001; Hudson and Wehrell, 2005). The individual loans ranged from \$1,000 to \$15,000 and were approved for borrowers with relatively higher net worth and larger businesses (Frankiewicz, 2001; Gomez and Santor, 2003). In 1997, Calmeadow sold PAL to Vancity Credit Union and in 2000, it sold Metrofund to Metro Credit Union. The sale of Metrofund marked the end of Calmeadow's involvement in microcredit programs in Canada.

Vancity Credit Union continues to operate its Peer Lending Program. In addition, the awareness generated by Calmeadow's microcredit initiatives had inspired other microcredit programs across Canada. The Social Investment Organization and Riversdale Community Development Corporation reported that there were at least 60 microcredit funds in Canada in 2003 (cited by Visano, 2008; P. 109). Some of these programs are still in operation today. They include Yukon Micro Loan Program; GEODE Stepping Stone Loan Program in Greater Sudbury; PARO Centre for Women's Enterprise Program in Northern Ontario; Newfoundland and Labrador Federation of Co-operatives Micro Loan Program; Momentum Micro Business Loan Program in Calgary; St. John's community Loan Funds, as well as SEED Winnipeg.

The GEODE Stepping Stone program offers a maximum loan of \$3,000. Loan sizes for Momentum as well as for St. John's Community Loan Fund go to a maximum of \$7,500. The microcredit loan from SEED Winnipeg ranges from \$1,000 to \$10,000. The microcredit programs of Vancity Credit Union, as well as the PARO Centre for Women's Enterprise give loans of between \$500 and \$5,000. Between 1995 and 2008, PARO served a total of 52 peer lending groups. Each group comprises of four to seven female borrowers. In 2008

alone, PARO delivered a total of \$239,500 in 136 loans to group members.<sup>1</sup>

Vancity's Peer Lending Program is arguably the oldest microcredit program in the country. Data obtained in 2009 from the program revealed that it had delivered at least 434 loans to 245 households since 1997. Total outstanding loan as at July 2009 was \$90,644. Interest rate on the loans was mostly 5.25% for loans approved prior to 2008 and 6.25% for more recent loans. Further details about the quantitative as well as qualitative data from Vancity's Peer Lending Program are presented in chapter 3.

Since 1998, the government of Canada, through Western Economic Diversification (WED), has provided a total of at least \$5 million to five credit unions for the expansion of micro lending operations across the country. The credit unions are Assiniboine in Winnipeg, Affinity in Saskatoon, Servus in Alberta, as well as Vancity and Coast Capital Savings in Vancouver. WED-sponsored micro loan programs are based on the individual lending model and give loans to a maximum of \$35,000. Eligibility requirements include lack of credit history and insufficient collateral to access the traditional sources of business loans.

Most of today's micro lending activities are undertaken by credit unions (Coyle, 2002; McKillop et al., 2007; Strandberg and Plant, 2004; Hebb et al., 2006). The dominant position of the credit unions may be regarded as arising from the non profitability of microcredit lending operations, given that mainstream banks with the objective of profit maximization do not engage in microcredit lending. Credit unions are financial cooperatives – owned by their own customers. Because cooperatives are vertically integrated into the consumer sector, they have a different objective function than mainstream banks. A cooperative has the objective of maximizing the welfare of its members (customers) subject to the cooperative's own profit being nonnegative (Fulton and Giannakas, 2001). This different objective of cooperatives (as compared to that of mainstream banks) could help explain why credit unions have a greater focus on micro credit.

Credit unions place more emphasis on community development, and have a different governance structure than mainstream banks. Unlike in banks where voting power is based on the investor's share, credit unions allocate equal voting powers to all its members (i.e., customers – including microcredit borrowers).

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<sup>1</sup>Information in this paragraph is as obtained from the websites of the various programs.

### **2.1.2 Microcredit Programs in the United States**

The history of MC in the United States dates back to the early 1980s when Women's Self-employment Project (WSEP) established the Full Circle Fund to deliver microcredit to low-income women in inner city Chicago (Zephyr, 2004; Conlin, 1999). The Full Circle Fund used a group lending model. By the late 1980s there was an increase in the number of U.S. microcredit programs. The Pine Ridge Indian Reservation in South Dakota became home to the Lakota Fund MC program in 1986 (Pickering and Mushinski, 2001). Two years later, MC was introduced in rural Arkansas by the Good Faith Fund and, in 1991, ACCION established a microcredit program in New York (Taub, 1998; Zephyr, 2004; Burrus, 2005).

ACCION has since spread its microcredit programs to several other U.S. locations and is today the most prominent MC provider in the United States. By 2005, ACCION claimed to have disbursed over 100 million dollars in microcredit to 10,000 microentrepreneurs with a historical average loan size of \$4,500 and a cumulative loan loss rate of 5% (Burrus, 2005).

By 2008, there were at least 263 microcredit programs in the United States with at least 124 programs serving rural communities and at least 121 operating in urban areas (Girardo and Edgcomb, 2011). The microcredit programs had faced a difficult learning curve over the years in adapting their operations to the socio-economic environment of the U. S. The early MC programs were mostly criticized for having high operational costs and a high default rate. The problem was due in part to the ineffectiveness of the group lending methodology in the United States, as in other developed economies where social capital is inadequate (Taub, 1998; Zephyr, 2004). Most of the early MC programs that experimented with group lending either had to convert to individual lending or close entirely as unsustainable programs. Of the 198 MC programs recorded in 2003, only 36 used group lending while the remainder operated as individual lending programs (Edgcomb and Klein, 2005; Burrus, 2005). Similar to the trend in Canada, some U.S. microcredit programs now provide loans up to a maximum of \$35,000 (Girardo and Edgcomb, 2011).<sup>2</sup>

Operational cost decreased over the years. While it cost the median MC program \$2.33 to loan \$1 in 1998, the cost to loan a dollar in 2003 was estimated at \$0.44 (Burrus, 2005). However, MC programs are yet to reach a sustainable scale. The MC programs do not generate enough revenues to cover the cost of operations. For instance as of 2004, cost recovery by ACCION ranged between 20 and 63% across the different locations of its

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<sup>2</sup>ACCION New Mexico lends microcredit of between \$200 and \$50,000 (Berger et al., 2007, p.6.)

program (Painter and Tang, 2001; Burrus, 2005). This lack of self-sufficiency means MC programs have continued to rely on external sources of funds to keep their operations going. These sources include charitable donations from private and corporate groups, community loan funds, governments, churches, as well as banks and other financial institutions. In 2008, only 16.3% of the total operating budget of U.S. MC programs came from earned incomes — 28% came from private donors and 39% came from government (Girardo and Edgcomb, 2011).

Practitioners believe the number of households that have so far been served by U.S. microcredit programs represents only a tiny fraction of the potential market. There were at least 13.1 million microenterprises in the United States as of the year 2001 (Edgcomb and Klein, 2005; Burrus, 2005). Of this number, between 6 million and 10.8 million were reported to have difficulty accessing traditional sources of business loans. Additionally, Edgcomb and Klein (2005) estimate that there are about 140,000 households among welfare (income assistance) recipients who would like to become self-employed. In all, only a total of 114,000 IA recipients and non-recipients were reached by the entire network of U.S. microcredit programs in the year 2000 (Edgcomb and Klein, 2005).

### **2.1.3 Essential Features of Microcredit Programs in the United States and Canada**

#### **Business Training**

In both the United States and Canada, a common feature among microcredit programs is their provision of business training for borrowers (Conlin, 1999; Loxley, 2003; Hudson and Wehrell, 2005; Edgcomb and Klein, 2005; Girardo and Edgcomb, 2011). In some cases, the training is provided directly by the MC program. In other cases, the MC program forms partnerships with other community development agencies to which they refer their microcredit borrowers for business training (Burrus, 2005; Cameron, 2007). Borrowers are trained on simple bookkeeping, business planning, and marketing. Some microcredit programs make completion of a business training program mandatory for borrowers.

Justification for providing business training for microcredit borrowers draws from the belief that the socio-economic circumstances of low-income households does not arise from the lack of credit alone, but also perhaps from the lack of requisite knowledge and skill to successfully manage a business (Servon and Bates, 1998; CSEHub, 2009). By providing business training for borrowers, microcredit programs attempt to maximize borrower successes with the loans. Business training however imposes additional costs on the microcredit programs (Hudson and Wehrell, 2005).

## **Periodic Repayment Schedules**

Microcredit programs issue their loans with a repayment term of between four months and four years depending on the size of the loan (Servon and Bates, 1998; Pollinger et al., 2007). The largest loans carry the longest repayment terms. Over the term, repayment is required in multiple installments. Repayment typically begins in the first month from the date on which the loan was disbursed and continues every month until the entire loan is repaid. Some programs require borrowers to make the repayments in biweekly installments (Hung, 2006). By requiring periodic repayment of the loans, microcredit programs are able to detect delinquent borrowers early and to reach out to the borrower to avoid default (Williams, 2004; Morduch, 1999).

## **Sequential Lending**

Microcredit programs typically approve loans in stages. A first-time borrower may get only the minimum amount on the program. Upon successful repayment of the first loan, the borrower may be approved for a next loan of a higher amount (Servon and Bates, 1998). The number of loan stages on the program, as well as the incremental amount of each successive loan stage, varies with the program. Vancity Peer Lending Program, for instance, typically approves \$1,000 to \$2,000 for a first-time borrower while returning borrowers get up to \$3,000 or \$4,000. A fifth-time borrower on the program typically gets the maximum amount of \$5,000. Additionally, those who have successfully participated in the peer lending program may apply to the WED-sponsored micro loan program where they could eventually get up to \$35,000.

By adopting a sequential lending model, the microcredit programs reduce the risk of loan loss to delinquent borrowers. The borrower's repayment performance with the smaller loans on the program helps the program determine its credit worthiness for larger loans (Morduch, 1999).

### **2.1.4 Program Impact**

Available reports indicate aspects of program impact on households that may be desirable from both a private and a social perspective. Microcredit programs target low-income households that are unable to access the conventional sources of loans due to a poor or nonexistent credit history (Frankiewicz, 2001; Vancity, 2005). Participation in the microcredit program offers such households the opportunity to build a good credit history to ease their future access to larger business loans.

Microcredit programs have also been reported to promote income assistance recipients' transition to work (Wehrell, 2002; Clark and Kays, 1999; Sanders, 2002; Klein et al., 2003). Some studies report that poor households who use microcredit programs are the most credit worthy among the poor compared to those on income assistance who are the least credit worthy (Light and Pham, 1998; Schreiner, 1999). Some IA recipients are believed to shy away from participation in microcredit programs because the IA policies produce a disincentive for self-employment (Schreiner, 1999; Klein et al., 2003). Those who use the MC program have been reported to experience an increase in earnings and therefore a decrease in reliance on IA programs (Wehrell, 2002; Clark and Kays, 1999; Sanders, 2002; Klein et al., 2003).

## **2.2 Income Assistance Programs**

The objective of modern IA programs is to provide financial assistance to low-income households to enable them meet their basic needs (Barrett and Cragg, 1998). Under the programs, eligible households receive monthly (or bimonthly) benefits. Eligibility is based on an ongoing assessment of resources available to an applicant household.

In both Canada and the United States, income assistance (popularly known as welfare in the United States) is one of the many programs under a broader social safety net. Some of the other programs in Canada's social safety net are Employment Insurance, Health Care, Child Tax Benefits, Disability Assistance and Old Age Security. Programs in the U.S. safety net include Medicaid, Food Stamps, Earned Income Tax Credit, Housing Assistance and Unemployment Insurance. These other programs within the safety net either deliver benefits in kind, e.g. health and housing, or they are tied to a specific group, e.g. the disabled or the aged (Blank and Hanratty, 1993; Bitler et al., 2010).

What distinguishes income assistance from these other programs is that IA benefit is in cash, rather than in kind, and is meant to guarantee a minimum income to all who lack sufficient earnings. Some recipients of income assistance may also be eligible for one or more of the other programs in each country's safety net (Danziger et al., 1981; Frech, 2009). This section focuses on income assistance programs in line with the goals of this dissertation.

### **2.2.1 Income Assistance Programs in Canada**

In terms of expenditures, IA is the fourth largest social transfer program in Canada (INAC, 2007). The beginning of income assistance in Canada was delayed by a long



period of disagreement between the federal and provincial levels of government. In 1935 (during the period of economic depression), Prime Minister R. B. Bennett attempted to introduce an income assistance program through an Employment and Social Insurance Act. The proposal was opposed by provinces because the federal government had no powers to enact such an act. In 1945, the federal government made another attempt at income assistance through its Green Book proposal. Funding arrangements between the federal and provincial government became an issue of contention and a reason for the failure of the proposal (Moscovitch, 1988).

The high unemployment rate of 1953 – 1954, motivated another round of discussions which ultimately culminated in the Unemployment Assistance Act of 1956 (Osborne, 1985; Moscovitch, 1988). The act required the federal government to reimburse half of each province's benefit payment to employable persons who were unemployed. No ceiling was placed on individual benefits or on federal expenditures. The unemployment assistance act was a categorical welfare legislation as it was specific to persons categorized as "unemployed employables."

In 1966, Canada's government introduced a universal welfare legislation — the Canada Assistance Plan (CAP) — covering income assistance payments to "unemployed employables" as well as payments to other categories of persons such as the disabled and the aged (Allen, 1993). CAP replaced the Unemployment Assistance Act as well as earlier social transfer acts such as the Disabled Persons Allowance Act of 1954 and the Old Age Assistance Act of 1951. Under the CAP, the federal and provincial government were each responsible for 50% of IA spending in each province (Lemieux and Milligan, 2008; Barrett and Cragg, 1998). Households' eligibility was completely based on needs, with broad guidelines set by the federal government, and with provinces having no powers to restrict benefits to households based on work requirements or length of residency in their jurisdiction. The 100% matching grant of CAP meant that federal funding grew without limits in consonance with provincial spending, which escalated over the next two decades due to an increase in welfare caseloads. Barrett and Cragg (1998) report that the number of IA recipients in Canada grew from 1.2 million to 2.7 million while total federal-provincial per capita expenditure increased from \$106 to \$268 (in 1992 dollars) over the 1970 to 1992 period.<sup>3</sup>

The increase in the IA caseload was blamed partly on the recessions in 1974–75, 1981–82, and 1990–92 (Barrett and Cragg, 1998; Kneebone and White, 2009). However, the years of economic growth that followed the recessions did not result in a significant decline in

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<sup>3</sup>The number of recipients represented 5.7% and 9.5% of Canada's population in 1970 and 1992 respectively.

the caseloads (Barrett and Cragg, 1998; Kneebone and White, 2009). The increase in IA expenditures gave impetus for change in the IA policy of Canada. In 1990, the federal government put a 5% limit on the annual increase in its CAP funding for the three richest provinces, Ontario, Alberta, and British Columbia. The federal governments action was an attempt to curtail its escalating expenditure on IA.

In 1996, CAP was replaced by the Canadian Health and Social Transfer (CHST) plan, which effectively ended the federal government's cost commitment to income assistance. The CHST was a federal transfer payment provided to provinces and territories as a block funding for health care, post-secondary education, income assistance, and other social services (Kneebone and White, 2009; INAC, 2007).<sup>4</sup> The removal of the federal government's cost commitment to IA was accompanied by the granting of greater autonomy to the provinces to set their own program rules and standards (INAC, 2007). Therefore, the provinces were able to freeze benefits, tighten the conditions for eligibility, and introduce work requirements in an attempt to minimize program spending (Brzozowski, 2007; Kneebone and White, 2009).

Following these reforms, the income assistance caseloads in each of the provinces has been on the decline from a peak in the mid-1990s.<sup>5</sup> The total number of IA recipients across the different provinces and territories in Canada decreased from an estimated 2.2 million in 1997, to 1.3 million in 2008 (HRSDC, 2010).

Provincial autonomy meant that provincial policies developed independently from one another and IA programs today vary across the provinces. Therefore, the income assistance programs are referred to by different names in the different provinces and territories in the country. For instance while the program is known as Social Assistance in Prince Edward, New Brunswick, Saskatchewan, and Yukon, it is called Income Support in Nunavut as well as in Newfoundland and Labrador.

The programs differ in their rules of eligibility, their basic benefits, as well as the fraction of earnings an IA recipient is allowed to keep (the earnings exemption). The basic benefit is the guaranteed benefit a household would be eligible to receive if it had no income from any other source. The earnings exemption rule defines an implicit tax rate by which the basic benefit is reduced as the recipient's earnings increase. In the province of Ontario, 50% of the monthly earnings of an IA recipient with no disability is clawed back from the guaranteed benefit. The corresponding tax rate for Nova Scotia and British Columbia is

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<sup>4</sup>The CHST plan was replaced in 2004 by the Canada Health Transfer (CHT) plan which provided funds for health care and the Canada Social Transfer (CST) plan which gave block funding for post-secondary education, income assistance, and other social services.

<sup>5</sup>Unlike in other jurisdictions, the number of IA recipients has actually been on the rise in Nunavut, from 8,100 in 2001 to 15,523 in 2008.

Table 2.1:  
Monthly Basic Benefits for Employable Single Adults and Lone Parents on Canada's Provincial and Territorial IA Programs

Province/Territory	Program Name	Monthly Basic Benefit (\$)	
		Single Adult	Lone Parent (One Child)
Newfoundland & Labrador	Income Support	674	1,040
Prince Edward	Social Assistance	555	945
Nova Scotia	Employment Support and Income Assistance	510	780
New Brunswick	Social Assistance	294	809
Quebec	Last-Resort Financial Assistance	589	709
Ontario	Ontario Works	573	911
Manitoba	Employment and Income Assistance	505	803
Saskatchewan	Social Assistance	693	1,024
Alberta	Alberta Works- Income Support	583	889
British Columbia	Employment and Assistance	610	946
Yukon	Social Assistance	1,240	1,612
North West Territories	Income Assistance	1,412	1,744
Nunavut	Income Support	3,621	3,893

Source: *National Council of Welfare Reports: Welfare Income 2009*, Vol. 129, Winter 2010

70% and 100% respectively. The IA program in Manitoba allows recipients to keep the first \$200 of earnings while 70% of the remainder is clawed back from the guaranteed benefit (HRSDC, 2010). Table 2.1 shows the monthly basic benefit for an employable single adult and an employable lone parent with one child across the provincial and territorial IA programs in Canada.<sup>6</sup>

<sup>6</sup>The programs typically pay higher amounts of basic benefit to IA recipients with more children as well as to those who are considered unemployable due to disabilities.

### **2.2.2 Income Assistance Programs in the United States**

Income Assistance in the United States is commonly referred to as Welfare. Beginning in 1935 during the Great Depression, the federal government of the United States has funded welfare program for low-income families. Between 1935 and 1996, the government's commitment to welfare was through the Aid to Families with Dependent Children (AFDC) program. The AFDC was originally called the Aid to Dependent Children and aimed to provide benefits for needy dependent children. Under the initial arrangement, participating states were required to pay benefits to dependent children aged 15 and younger, while the federal government reimbursed the states for one-third of the benefit payment to each eligible child. The federal government's reimbursement was capped at \$6 for each first child and \$4 for each additional child in the family. This meant states could get one-third of their benefit payment reimbursed as long as the benefits did not exceed \$18 for the first child and \$12 for each additional child. Total reimbursement to each state was however not capped and therefore federal expenditure grew without limits as states' welfare caseloads increased.

In 1961, the AFDC program was expanded to also pay benefit to any unemployed parents of the needy dependent children (Hoynes, 1996). It was again expanded in 1962, to pay for a second parent in a family with an unemployed or incapacitated parent and the program was renamed as AFDC. By 1965, the federal government increased its reimbursement of states' benefits from one-third to one-half. The next three decades were to witness a rapid growth in welfare caseloads as well as in public expenditure on the program. The number of families on the AFDC program increased from 800,000 in 1960 to 3.7 million in 1985 (Moffitt, 1992). Public spending on the program increased from \$1.7 billion in 1965 to \$12.8 billion in 1981 (Danziger et al., 1981). In 1995, public expenditure on welfare benefits reached \$22 billion. This amount was comprised of benefit payments alone and did not include the administrative cost of the programs (Zedlewski and Giannarelli, 1997).

The growth in welfare caseloads and spending was accompanied by public outcry against the programs (Gueron, 1993; Handler, 1995; Dickerson, 1999). The AFDC was believed to depress work incentives among recipients. First, the disincentive for work was influenced by the earnings tax rate on the program. Upon inception in 1935, the program had applied a 100% tax rate on the earnings of eligible families. The tax rate was lowered to 67% in 1967, and again increased back to 100% in 1981 (Moffitt, 2003). Second, eligible households were deemed entitled for benefits as long as their resources fell below their officially approved needs. The program placed no limit on the duration of receipt of benefits and required no work efforts from families. Therefore, a welfare class arose and

comprised of households with perpetual dependence on welfare (AuClaire, 1979; Duncan et al., 1988).

By 1993, some states had started to receive waivers from federal welfare rules. The waivers gave them the autonomy to enforce strict work requirements on welfare recipients. At about the same time, the country started to witness a rapid macroeconomic growth and many welfare recipients took up jobs and dropped out of the welfare caseload. Therefore, after having reached a peak of 5.1 million families in 1994, the U.S. welfare caseload started on its current long-term decline (Grogger, 2004; Frech, 2009). AFDC caseloads decreased nationwide by an average of 18% between 1993 and 1996, and the decrease was as much as 40% in some states (Ziliak et al., 2000).

In 1996, the administration of President Bill Clinton made a wholesale reform of U.S. welfare policy. The reform was brought about by the Personal Responsibility and Work Opportunity Reconciliation Act (PRWORA) which was passed by Congress in August 1996 (Caputo, 2009). The law abolished the AFDC and replaced it with the Temporary Assistance to Needy Families (TANF) program. TANF was a block grant of \$16.5 billion per year which the federal government gave to states toward benefit payments to needy families. In contrast to the AFDC program under which the duration of assistance had no limit, the new policy placed a five year (60 month) lifetime limit on the payment of benefits to a recipient.

To be eligible for the TANF grant, each state was required to satisfy a maintenance of effort (MOE) obligation. The MOE obligation required that states continued to spend at least 75% or 80% of their 1994 (AFDC) expenditure on welfare (Peterson, 2002). Additionally, states were required to meet specified work participation rates by welfare recipients. At least 50% of recipients in a single-parent household must work for no fewer than 35 hours per week while at least 90% of recipients in a two-parent household must work for no fewer than 55 hours total per week. States that did not meet the MOE obligation were to be liable for penalties including the denial of the TANF grant (Greenberg, 2002; LeMire, 2008). The 1996 welfare reform was reauthorized in 2002, and has been sustained to date.

The work requirement that was introduced with the reform, as well as the robust economic growth of 1994 to 2001, helped to sustain the decreasing trend in welfare caseloads that started two years before the reform. As of 2008, the number of families receiving the TANF benefit was only 1.6 million (Frech, 2009). The reforms occurred concurrently with economic growth, and economists have been engaged in a debate as to how much of the observed decrease in historic welfare caseloads is due to economic growth and

how much is due to welfare reform (Ziliak et al., 2000; Grogger, 2004; Bell, 2001; Ribar, 2005).

Because TANF is a block grant, the federal government allows each state to set the guaranteed benefit levels and earnings tax rate on their respective programs. Therefore, both the benefit levels and tax rates differ across the states. In 2009, the maximum monthly guaranteed benefit for a family of three on TANF funded programs ranged from \$170 for Mississippi to \$923 for Alaska (Frech, 2009). Earnings tax rate on the programs mostly falls between 50% and 75%. A few states have tax rates as high as 100% while a few others have zero tax rate (Moffitt, 2003).

## **2.3 Summary**

Income Assistance caseloads have declined in both the United States and Canada after having reached a peak in the mid 1990s. The decline in IA caseloads has been attributed to policy reforms as well as to macroeconomic growth. The policy reforms discouraged dependence on IA at the same time as macroeconomic growth made it easier for former IA recipients to find jobs.

Microcredit was introduced into both countries a few years before the IA caseloads started to decline. The number of MC programs in both countries has increased alongside the decline in IA caseloads. The MC programs target IA recipients as well as non-recipients who need microcredit to become self-employed on a microenterprise. Available reviews suggest that the impact of MC programs on household income is mixed. Some households are observed to experience a loss in income as a result of time allocation to a microenterprise.

## Chapter 3

# Sequential Borrowing and Earnings Changes among Vancity's Microcredit Participants

### 3.1 Introduction

The preceding chapters highlighted sequential lending as an essential component of microcredit programs. Additionally, the preceding discussions noted that some households have experienced a decrease in their earnings upon self-selection into a microcredit program. This chapter presents qualitative and quantitative evidence of sequential borrowing among participants in Vancity's microcredit program. The chapter also presents evidence of a decrease in earnings relative to the pre-participation period in some of the households.

The qualitative data was obtained from interviews carried out in November 2008 with seven borrowers on Vancity's Microcredit Program. The interviews represented the first phase of this dissertation. The purpose of the interviews was to gain first hand information about the experiences of microcredit users, with a view to identifying a researchable question. The respondents were determined with the help of Vancity Credit Union. The credit union provided the contact information of borrowers who had indicated their consent to be interviewed. Out of twelve borrowers who provided contact information, only seven eventually made themselves available for interview. The respondent determination and interview methods were approved by the Behavioural Research Ethics Board of the University of Saskatchewan in July 2008.

The respondents included three men and four women. One of the respondents had been on the microcredit program for ten years and had borrowed a total of five loans totaling \$20,000. The remaining six respondents had between one and three years of participation in the program and had borrowed between one and three loans. Cumulative loan use among these six respondents ranged from \$1,000 to \$6,000.

The interviews were conducted privately with each respondent. Five respondents had the interviews in their homes, while the remaining two were interviewed in a restaurant. Each interview was semi-structured, lasting for at least 90 minutes. The interview questions elicited respondent discussion of their motivation for taking the loan, what the loans were used for, how the loans had affected their household incomes, and how the borrowers felt about the peer lending technique used by the program. The oral interviews were transcribed and analyzed to identify issues that resonated across the respondents.

Additionally, quantitative data was obtained in August 2009 from Vancity's electronic records, as well as from the paper application forms completed by households in applying for the microcredit loans. As of August 2009, at least 456 microcredit applications have been made by at least 245 households since the program's inception in 1997. Only 22 of these applications were declined, while the rest were approved. Below is a discussion of the qualitative and quantitative data from the program.

## **3.2 Information from Interviewed Borrowers**

The data collected from the interviews shed light on a number of issues such as the use to which the loans were put, the impact of the loans on borrowers' incomes, the sources of funds for repayment, the incentive for repayment, and the ineffectiveness of the group-lending model.

### **3.2.1 Use of the Microcredit Loans**

Four respondents reported starting up a microenterprise with their loans. Two other respondents reported using their loans to expand an already existing microenterprise. The remaining respondent reported consuming the loan due to previously unforeseen circumstances. For the six respondents who reported investing their loans, the nature of investment included the purchase of fabrics, sewing machines, computers, cameras, video recorders, packaging materials, and labeling machines. Their microenterprises were completely owned and managed by the borrowers themselves. None of the respondents had an employee.

### **3.2.2 Preference for Microcredit Relative to other Sources of Credit**

Microcredit is sometimes regarded as being one of the alternative sources of credit for households that have no credit history. While credit cards and payday loans are believed



to be alternative means by which such households may build a credit history, interview respondents indicated their preference for microcredit. Five of them narrated the difficult experience they had in applying for a credit card. One respondent reported having to make a security deposit of \$300 before being granted a credit card of the same amount. Another reported being asked to provide a guarantor with a good credit standing so as to be approved for a credit card of \$1,000. This respondent's refusal to get a guarantor as requested is understood from the following quote;

...Except for credit card which I don't want to do. I don't want anybody to go and sign for me. The problem is my privacy, confidentiality, self respect, and so on.... I am a very independent person. I like to be self reliant. Although if really pushed to the corner sometimes I can do things like that, but I don't want to do it now. I want to try this [microcredit] first and see what happens.

For the four respondents who eventually succeeded in getting a credit card, they also reported not using the cards because they are more expensive than microcredit. The reported interest rates on their credit cards ranged from 9% - 19.5%.<sup>1</sup>

### **3.2.3 Impact of Microcredit on Borrower Income**

Only three of the respondents reported an increase in income as a result of having invested the loans, while the remaining four claimed that the loan had not had a positive impact on their household incomes. Among the four respondents with no income increase, was the one who had consumed her loan. One respondent specifically reported a decrease in household earnings as a result of participating in the microcredit program.

### **3.2.4 Sequential Borrowing**

Among the borrowers who reported making no profit from investing the loan, this negative result was blamed on the smallness of their microcredit investment, as can be understood from the following comments from a respondent with a \$1,000 loan.

It is not enough, but you know the program just say \$1,000. We try to push for \$2,000 at least but she [the program manager] doesn't agree and the people [i.e., the program staff] doesn't agree but we try. If the person is good for six or four months he repay the money, maybe they can give instead \$2,000 or \$3,000.

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<sup>1</sup>Vancity's microcredit loans carry an interest rate of between 5.25% and 6.25%.

The above comment indicates that some borrowers obtain the maximum amount that is offered to them by the program, which depends on the borrower's history of participation, and which may be insufficient as a profitable investment. This viewpoint was restated in the following comment from another respondent in explaining the reason for borrowing only \$1,000 from the program.

Because, they won't give you more than that. They want to know if you pay on time, if you are a good customer or not — because you are making a credit [history] from that \$1,000, you are making credit [history] yourself. If you didn't pay it off — because some people they don't pay it off, some people they don't pay on time, this is all credit [history] — so next time, they won't give you any money because your credit [history] is not good, you don't pay on time. That's why they give you \$1,000 [at] first. As long as they know that you are good, you pay on time, you don't have any late payment, they trust you and then [next time], they give you more.

For this respondent, the goal was to someday be able to acquire a loan for the purchase of a business truck. Therefore, apart from revealing that a borrower may be willing to obtain a loan that is too small for profitable investment, the interviews also provided a clue as to why such willingness may occur — the loan is only the smallest in the sequence of loans that can be obtained by the borrower, and access to the larger and more profitable loans in the sequence is possible only after a smaller loan has been borrowed and repaid.

The sequence of loans extends beyond those offered by the microcredit program. The interviews revealed that households that have acquired a good credit history as a result of their microcredit participation may transition from taking microcredit to taking larger loans from traditional sources. For instance, one borrower who had used up to three loans on the microcredit program commented:

My loan payments I have, my plan was like pay all these with Vancity, and get the line of credit.

Another borrower who had also used up to three microcredit loans commented:

I think that when I finish paying this loan, I will be okay. Like I think if I talked to Vancity, they would give me the line of credit.

Therefore, sequential borrowing may be thought of as a household's movement through the different loan stages within the microcredit program, as well as movement from the microcredit program to outside sources of larger loans for which credit scores are required.

### **3.2.5 Sources of Funds for Repayment**

Only three respondents reported repaying the loans from their microenterprise profits. Three respondents reported obtaining their repayment fund from some paid employment as their microenterprise was not profitable enough to meet their repayment obligations. For one respondent, the repayment fund came from some income assistance benefit. Additionally, one of the respondents reported having met his first four repayment schedules from the loan itself.

### **3.2.6 Incentive for Repayment**

Six respondents (including the one who had consumed the loan), reported being up to date with their loan repayment schedules. One respondent was delinquent at the time of interview. The respondents reported repaying the loans either for the psychological benefits, or for access to a next loan.

Six respondents sounded very enthusiastic about maintaining the trust that Vancity Credit Union had in them. There was a general feeling of gratitude about the credit union offering them a loan when they had a bad credit history or when no other institution would have considered them credit worthy. They felt that fulfilling their repayment obligation was one way to express such gratitude.

Four respondents were desirous of moving up to the next loan to enable them expand their microenterprises. They understood that a next-loan application could be made only after they repaid the current loan and that any default or delinquency with the current loan would jeopardize their chances of being able to access the next loan. Four respondents reported having repaid their first loans before the due dates and having applied immediately for a second loan.

### **3.2.7 Ineffectiveness of the Group Lending Technique**

Vancity's microcredit program uses a group-lending technique. Prospective borrowers are required to belong to a group of three to seven members in order to be eligible for microcredit. Members agree to be jointly liable for one another's loans. Access to a next loan by any individual is supposed to be granted only after the loans made to every member of the individual's group has been repaid. The essence of the group lending technique is to ensure a high repayment rate on the program. Like the microcredit programs in developing countries, joint liability is supposed to provide an incentive for prospective

group members to screen only credit worthy individuals into their groups. Joint liability is also supposed to induce group members to monitor one another against delinquencies and defaults.

However, interview findings indicate that the group lending technique is ineffective among borrowers of Vancity's microcredit program. The seven respondents were drawn from six groups. Two respondents belonged to the same group while each of the remaining five was a member of a different group. The respondents believed that the group lending technique did not motivate repayment among borrowers as prospective borrowers do not screen one another before group formation. Additionally, the respondents reported that group members did not monitor one another to ensure repayment of the loans.

**Group Formation:** As reported by the respondents, each of the six groups they represent was formed in one of three ways — self-formed, facilitated or imposed.

**Self-formed:** Two groups were self-formed by their members. One of these was comprised of three members, while the other had four members. For this formation process, the first potential borrower to learn about the program identified another potential borrower of his or her choice, usually a friend, and the two in turn looked out for other potential borrowers with whom to form a borrowing group. The group of at least three members then approach the credit union for loans.

**Facilitated:** For one of the six groups represented in the interview sample, formation was facilitated by a loan officer. The respondent reported that members of this group had signified interest in the program, but could not get a group together because they knew no one who was interested in the program. A loan officer introduced the interested borrowers and allowed them to get to know one another and to decide whether or not they wanted to form a group. This group had a membership of three individuals, with a culturally heterogeneous background.

**Imposed:** Group membership was imposed for three of the groups represented in the interview sample. Vancity Credit Union had modified its peer lending model to include an animator, — a contract staff member who shared a similar cultural background with most of the borrowers he or she was assigned to work with. The animator liaised between the borrowers in a given group, as well as between the group and the bank. At the time of the interviews, the program had two animators, — one Aboriginal working with groups of Aboriginal borrowers, and another African working with groups of African immigrants. Respondents reported that the animator called for a meeting with existing members of a particular group, requesting them to admit a certain individual into the group. The existing members accept and sign the loan application form of the newest

member without any hesitation. The three imposed groups represented in the interview sample were African. Nonetheless, respondents reported that members speak different native languages, have different educational backgrounds and in some cases different cultural/religious orientations.

**Non-monitoring among Group Members:** At least three respondents reported not attending any group meetings since joining the group. Respondents also reported being unaware of who their group members were or the number of borrowers in their group. Therefore, the respondents reported that they did not monitor one another against delinquencies and defaults. Six respondents believed the microcredit program does not take joint liability seriously and that their access to a next loan was not tied to the repayment performance of group members.

### **3.2.8 Microcredit Participation by Income Assistance Recipients**

The interview revealed that some income assistance recipients also participate in microcredit programs. Three of the seven respondents reported being income assistance recipients at the time of joining the microcredit program. Of these three, two eventually relinquished IA after some period of microcredit participation — the two were no longer IA recipients as of the date of the interviews. The respondents reported facing a 100% earnings tax rate from the IA program. They reported to have self-selected into the MC program out of a desire to generate their own income and break away from income assistance.

## **3.3 Quantitative Evidence for Sequential Borrowing**

Quantitative data from borrowers' loan application forms constitutes 417 observations from 245 households. A household typically makes a first loan application on an initial date, and then returns at a later date to apply for a next loan. Approval of a next-loan application is contingent upon successful repayment of the previous loan. Table 3.1 gives a brief summary of the quantitative data for households whose loan applications were approved between 1997 and July 2009.<sup>2</sup> The differences in sample size ( $n$ ) with respect to each variable is due to missing data.

As of the date of data collection, the number of loans that had been obtained by each household ranged from one to five. Out of 417 approved applications for which data is available, 223 were for first-time borrowers, 123 were for returning borrowers applying

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<sup>2</sup>Data is generally unavailable for households whose applications were declined.

Table 3.1:  
Descriptive Statistics from Vancity's Microcredit Program

<b>Application Type</b>	<b>1<sup>st</sup> loan</b>	<b>2<sup>nd</sup> loan</b>	<b>3<sup>rd</sup> loan</b>	<b>4<sup>th</sup> loan</b>	<b>5<sup>th</sup> loan</b>	<b>sample size <math>n</math></b>
Number of approved applications	223	123	36	23	12	417
Mean value of approved loan (\$)	1,470	2,330	3,314	4,164	3,909	412
Mean monthly earnings of applicants (\$)	1,093	2,367	2,294	2,741	-	126
Mean monthly incomes of applicants (\$)	1,700	2,366	2,586	2,989	-	96
Mean age of applicants	37	38	41	40	49	179
Applicants' mean years of participation	0	1.1	2.8	4.3	5	181

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All earnings, incomes, and loans are in 2002 Canadian dollars. The real amounts of incomes, earnings, and loans were derived from nominal values using Statistics Canada's CPI for Vancouver (CANSIM; Table v41695228, Vancouver, British Columbia [59933]).

for a second loan, while 36, 23, and 12 applications were for a third, fourth and fifth loan respectively. The mean value (in 2002 dollars) of the first loan was \$1,470, the mean value of the second loan was \$2,330, while the mean values of the third, fourth, and fifth loans was \$3,314, \$4,164, and \$3,909 respectively.

Except for the mean value of the fifth loan, these figures suggest an increase in loan size along the sequence of loans. Between the first and second loan, the average approved amount increased by \$860. Between the second and third loan the average amount increased by \$984, while the average amount increased by \$850 between the third and fourth loan. The slight decrease (\$255) in mean approved amount between the fourth and fifth loan cannot be easily explained without additional information. Of the twelve borrowers of a fifth loan in the sample, only five (representing 42% of the sample) were approved for the maximum amount (\$5,000) that the program offers to fifth-time borrowers. The data shows that borrowers generally avail themselves of the maximum loan they can obtain from the program. In all cases, the amount requested by an applicant was greater than, or equal to, what they were eventually approved for.

Table 3.1 suggests that first-time borrowers wishing to continue in the program typically return for a second loan about one year after borrowing the first. The table also shows that it takes an average of five years for households to move through the sequence of microcredit loans to the fifth loan.

As shown in table 3.1, the mean values of households' earnings differ from the mean values of their incomes. The differences are due to unearned incomes including income assistance benefits, child tax benefits, and child support. The mean monthly earnings (in

2002 dollars) range from \$1,093 for first time applicants (i.e., those who have not used any loans from the program) to \$2,741 for fourth time applicants (that is those who have used three loans from the program).

Table 3.1 suggests a high rate of attrition from the program as only about 55% of first-time applicants return for a second loan and only about 16% return for a third loan.<sup>3</sup> Discussions with the program staff, as well as the interviewed borrowers already cited above, revealed that some of the participants who drop out of the program may have transitioned to other sources of credit upon developing sufficient credit scores from their microcredit participation. These other sources of credit include in-store credit cards, overdrafts, and lines of credit.

### **3.3.1 Changes in Household Earnings Relative to Pre-participation Periods**

The quantitative data shows evidence of a decrease in earnings among some households that self-selected into the microcredit program. Within the data, earnings before participation is reported by households on their first loan application form. Earnings reported in subsequent loan applications (at which time at least one previous loan has been used and repaid), represents household earnings after a period of microcredit use. The change in each participant's earnings was estimated as the difference in reported earnings between its first and its most recent loan application.

Figure 3.1 plots the change in each participant's monthly earnings against the number of loans it had obtained from the MC program. The plot is comprised of 52 participants for whom the required data is available. Each of the 52 households had obtained at least one loan, and at most four loans, from the MC program. The real changes in their monthly earnings ranged from -\$1,560 to \$3,630.

Among households that had used only one loan from the program, the figure shows an earnings decrease for three households relative to their pre-participation periods. These households had each borrowed a first loan in the range of \$907 to \$943, and each experienced an earnings decrease of between \$25 and \$1,040. Figure 3.1 also shows an earnings decrease for three households among those that used two loans from the program. Each of the three households had borrowed an average of \$1,028 for the first loan and an average of \$2,700 for the second loan. Their reported monthly earnings after having used the two loans were between \$100 and \$1,560 less than their pre-participation levels. The graph

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<sup>3</sup>The number of approved applications has been regarded here as a good estimate of the number of returnees because, as stated earlier, only 22 out of 456 applications were declined, thereby suggesting a loan approval rate of almost 100%.

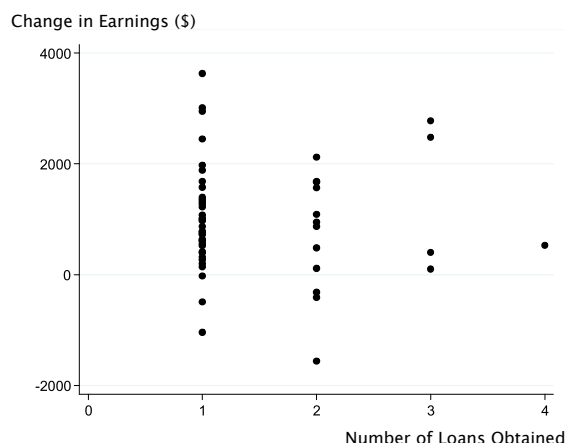


Figure 3.1: Amounts Borrowed and Changes in Household Earnings

includes only five households that had used more than two loans with all five earning above their pre-participation levels.

There is reason to suspect that the reported change in earnings is a function of household earnings before participation. Among the households that had obtained only one or two loans, those with the largest increase in earnings were more likely to be households with the smallest pre-participation earnings. On the other hand, households with a decrease in earnings were more likely to be those with the highest pre-participation earnings.<sup>4</sup> It is plausible that households which were previously under-employed or unemployed (i.e., little or no earnings), experience an increase in earnings when they obtain microcredit and invest some time in self-employment. It is also plausible that households that were fully employed on a wage job experience an earnings decrease when they obtain microcredit and re-allocate some time to a lower paying self-employment.

Care has to be taken in concluding that the observed changes in income are the result of participation in the microcredit program. To have confidence that the impact of the program is being measured would require an analysis of the counterfactual. Such would require a comparison of the changes in earnings of participants with the changes in earnings of nonparticipants that have similar household characteristics as the participants (Ravallion, 1991; Mustafa et al., 1996; Yaron et al., 1997 and Zaman, 1999).

<sup>4</sup>The average of pre-participation monthly earnings was \$660 for six borrowers with the largest increase in earnings among those who used only one or two loans from the program. On the other hand, the average of pre-participation monthly earnings was \$1,500 for the six borrowers whose earnings decreased.



### **3.4 Summary**

This chapter has presented data from Vancity's microcredit program to support the claims that households engaged in sequential borrowing may experience a decrease in earnings upon obtaining small loans. Additionally, data from the program suggests that the group lending technique is ineffective in motivating repayment, and that a borrower's repayment of the loans is driven by psychological factors as well as a desire to maintain the good credit record required to be eligible for sequential borrowing.

The finding that some households are willing to participate in microcredit programs at the expense of some earnings stands contrary to what could have been expected by conventional wisdom. The basic model of household time allocation to work suggests that a household which is faced with two alternatives would always allocate time to the more productive alternative. Having evolved before the advent of microcredit, the basic model did not contemplate the role of the sequential borrowing attribute of microcredit. Therefore, the next chapter develops a theoretical model of time allocation among households that are eligible for microcredit.

## Chapter 4

# Microcredit and Households' Time Allocation to Self-employment

### 4.1 Introduction

The widely acclaimed success of microcredit (MC) programs in developing countries has prompted their introduction into developed countries.<sup>1</sup> The earliest MC programs in the United States and Canada were introduced in the late 1980s and funded mainly by nongovernmental organizations. These programs were considered unsuccessful owing partly to a small client base and to a high rate of loan default (Frankiewicz, 2001; Taub, 1998). That notwithstanding, attempts at adapting MC programs to the United States and Canada are still ongoing.

Critics believe the success stories of microcredit in developing countries will be difficult to replicate in the United States and Canada (Taub, 1998; Zephyr, 2004; Williams, 2004). Their arguments include that the group lending technique used to guarantee a high repayment rate of the collateral-free loans is not adaptable to developed countries where social ties between prospective group members are relatively weak. Also, unlike in the developing world where poor households have no form of social support, low-income households in the United States and Canada are protected by government income assistance policies. The work disincentive from income assistance implies such households may not be willing to take up microcredit. Additionally, it is argued that the microcredit is small and that microenterprises lack the capacity to compete in developed economies where large businesses dominate. Besides, there is a relative availability of alternative paid work for

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<sup>1</sup>Empirical studies of the programs in developing countries have concluded that they improve household incomes (Khandker et al., 1998; Zaman, 1999; McKernan, 2002; Chavan and Ramakumar, 2002), reduce household vulnerability (Morduch, 1998; Zaman, 1999) and promote women's empowerment (Amin et al., 1998; Mahmud, 2003). However, there are some dissenting voices regarding the impact of these programs, particularly on the empowerment of women (Rahman, 1999; Isserles, 2003).

would-be beneficiaries of U.S. and Canada's MC programs. The demand for microcredit is low partly because many households are better off working as employees than as microentrepreneurs.

In an empirical analysis of U.S. MC programs, Sanders (2002) concluded that low-income households made no significant gain from participating in the programs. Spalter-Roth et al. (1994) observed low-income households combining wage work with self-employment had lower per hour earnings from their microenterprises than they did from wage work. Further, microenterprises — like every other business — have to cope with uncertainties, so risk-averse, low-income households may prefer to remain in a wage job in which the monthly paycheck is guaranteed. It is therefore not immediately clear why some households participate in the MC programs in the United States and Canada.

This chapter presents two models for explaining households' time allocation to microcredit. The first — a single-period model — draws from the existing theory of household time allocation to work as developed by Robbins (1930), Becker (1965), and Gronau (1977). A household's time allocation is influenced by its degree of risk aversion, its relative preference for leisure, as well as by the amount of capital available from the microcredit program. However, the single-period model only explains time allocation conditional on the household having self-selected into the MC program. It does not explain a household's decision to self-select into an MC program that would cause a short-fall in its current income.

This decision is explained by a two-period model, which shows that the demand for MC in the United States and Canada is due partly to the sequential-lending characteristic of most of the programs. Sequential lending means that a household's current-period use of microcredit gives it access to greater funds in a future period. Microcredit programs provide households with an opportunity to build a good credit history by successfully borrowing and repaying small loans. With a good credit history, the households may in the future be able to access a large sum of business capital from traditional sources of credit. Thus, under the two-period model, the effect of current-time allocation on a household's stream of future utilities is captured. The implication on current demand for microcredit is explored.

The rest of this chapter is organized as follows. Section 4.2 reviews relevant literature on household time allocation. Section 4.3 presents the single-period model of household time allocation. Drawing from existing theory, it begins with a household's utility maximization decision under time allocation between leisure and wage work alone. Microcredit is then introduced and the household's time allocation between leisure, wage work, and self-

employment in a microenterprise is considered. Next, the marginal effect of capital as well as the effect of risk aversion on time allocation is considered. Section 4.4 introduces the concept of sequential lending. It includes a discussion of some qualitative evidences of the influence of sequential lending on households' self-selection into the MC program. Section 4.5 introduces a two-period model in which current-time allocation affects household incomes in the current, as well as the future period. Section 4.6 discusses the model implications and concludes.

## 4.2 Literature Review

Economists have traditionally been interested in households' allocation of time between market work and leisure (Robbins, 1930). Since the article by Becker (1965), it has been known that Robbins' concept of leisure includes time spent on home work. Becker explains that apart from being utility maximizers, households are also producers. They combine the inputs of home time and market goods (from market work) in the production of utility-satisfying commodities such as sleep, seeing a movie, or baby sitting. The time inputs in producing these commodities have a cost which is forgone income from not allocating the home time to market work. Hence, the household seeks to minimize the time cost in the production of utility-maximizing commodities. In this formulation, households are both producing units and consumers.

However,, Becker's formulation did not explicitly disentangle the use of home time in home production (*pure* home work) from its use in consumption (*pure* leisure). Gronau (1977), p. 1100 explains this omission as partly due to the "practical difficulties in distinguishing between the two, given the number of borderline cases (e.g., is playing with a child leisure or work at home?)" The article distinguishes between home work and leisure by defining home work as "something one would rather have somebody else do for one (if the cost were low enough), while it would be almost impossible to enjoy leisure through a surrogate" (p. 1104). Hence, home work is seen as a close substitute for market work. By aggregating home production into a single commodity and assuming diminishing marginal return to time, Gronau shows that a pre-condition for an interior solution is equality of marginal product between the market sector and the home sector. In such an interior solution, time allocation to home work reduces as the wages from market work increase. Gronau also highlights the importance of household heterogeneity in time allocation. The model demonstrates how households with a high preference for leisure may choose to allocate time to only home production and leisure, with no time allocation to market work. In such a solution, the marginal product of time at home exceeds the market wage rate.

This theoretical exposition of a households' time allocation between leisure, home production, and wage work has been applied in the analysis of off-farm labour supply of farmers. Mishra and Goodwin (1997) conclude that the farm household's time allocation to off-farm work (wage work) is an increasing function of the perceived riskiness of farm production. Time allocation to farm work decreases with increased risk. Olfert et al. (1993), as well as Sumner (1982), conclude education increases the likelihood that a farm household also has wage work. Their finding that some households have both self-employment and wage work is consistent with Gronau's description of household with interior solution — allocating time to both housework and wage work (as well as leisure). Fuller (1990) described a household's simultaneous participation in self-employment and wage work as pluriactivity, thereby distinguishing it from part-time self-employment.

The role of capital in households' time allocation has so far been missing from these analyses. The introduction of microcredit programs in the United States and Canada means some households traditionally engaged in wage work may consider allocating some time to a microenterprise. Households who obtain the loan often invest it in home-based microenterprises (Schreiner, 1999; Frankiewicz, 2001; Gomez and Santor, 2003). The next section analyzes a household's time allocation to the microenterprise as a function of the available capital from a microcredit program.

### **4.3 Basic Model of Households' Time Allocation in a Single Period**

#### **4.3.1 Time Allocation in the Absence of Microcredit**

Consider a household which before the introduction of microcredit programs had no access to capital and therefore could not engage in a home-based business. Assume this household has no unearned income and that it is not possible to live without a source of income. The household's only option for earning a living is to work at a paid job. The traditional labour-leisure model suggests that at an interior solution to the problem of utility maximization, the household's marginal rate of substitution of leisure for income must equal the wage rate.

Denote the household's utility as  $U = U(Y, l)$ , where  $l$  is the time spent on leisure,  $Y = We$  is income,  $W$  is the wage rate and  $e$  is the time spent in paid employment. The total time available to any household is normalized to 1. The interior solutions are shown in figure 4.1 for two types of households.

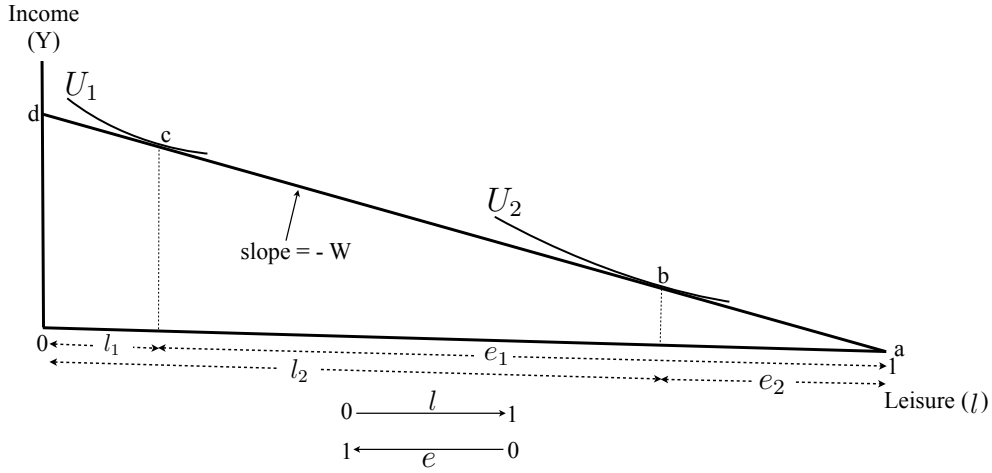


Figure 4.1: Household Type and Time Allocation between Leisure and Paid Work

The distinguishing characteristic between the households is their relative preference for leisure. Within the figure, the indifference curve labeled  $U_1$  belongs to a type-1 household — with a lower preference for leisure. The curve labeled  $U_2$  is for a type-2 household — with a higher preference for leisure. The line a–d is the income line with a slope of  $-W$ . At point c, utility is maximized for the type-1 household. This household allocates  $l_1$  of time to leisure and  $e_1$  to paid work. Utility is maximized for the type-2 household at point b, where  $l_2$  is allocated to leisure and  $e_2$ , to paid work.

### 4.3.2 Time Allocation in the Presence of Microcredit

Now, consider the case where microcredit programs have been introduced and the households described above have the option of obtaining a loan of amount  $k$  for investment in a microenterprise. Suppose profit from the microenterprise can be represented as

$$\Pi = \Pi(s, k) \quad (4.1)$$

The parameter  $s$  is time allocated to the microenterprise. The household's total income becomes the sum of its paid income and its self-employment profit:

$$Y = We + \Pi(s, k) \quad (4.2)$$

Its objective function becomes

$$\begin{aligned} \text{Max}_{e, s} \quad & U = U[We + \Pi(s, k), 1 - e - s] \end{aligned} \quad (4.3)$$

The following Khun Tucker necessary conditions must be satisfied at the optimal allocation of time:

$$\begin{aligned} \frac{dU}{de} = U_Y W - U_l \leq 0; \quad e \geq 0; \quad e \frac{dU}{de} = 0 \\ \frac{dU}{ds} = U_Y \Pi_s - U_l \leq 0; \quad s \geq 0; \quad s \frac{dU}{ds} = 0 \end{aligned} \quad (4.4)$$

The expression  $U_Y$  denotes the marginal utility of income,  $U_l$  is the marginal utility of leisure while  $\Pi_s$  is the microenterprise wage rate (that is, additional profit generated by spending an additional unit of time in the microenterprise). The first-order conditions in (4.4) embody an interior solution in which the household allocates time to all three activities (i.e.,  $l > 0$ ,  $e > 0$ , and  $s > 0$ ). It also contains the solutions in which time is allocated to at most two of the three activities. The solution that obtains depends on the household type, as well as the relative profitability of the microenterprise. The results are already well explained by existing theory within the context of household time allocation between home production and market work (Gronau, 1977). This theory has been applied in the analysis of off-farm labour supply of farmers (Bollman, 1979; Sumner, 1982; Olfert et al., 1993)

The conditions in (4.4) suggest that for an interior solution to hold, a portion of the microenterprise profit function ( $\Pi(s, k)$ ), must lie above the paid wage line a–d as shown in the first panel of figure 4.2. At the interior solution, the Khun-Tucker conditions yield

$$\Pi_s = W = \frac{U_l}{U_Y} \quad (4.5)$$

The fraction  $\frac{U_l}{U_Y}$  is the marginal rate of substitution of leisure for income ( $MRS_{lY}$ ). As illustrated in panel 1 of figure 4.2, the type-1 household — with a low preference for leisure — has the interior solution. This household reallocates some of its work time to the microenterprise. Returns from the microenterprise represented by line a–h exhibit diminishing marginal returns. Optimal time allocation to the microenterprise is  $s_1^*$  at which point the marginal profit  $\Pi_s$  from the microenterprise equals the wage rate  $W$  from paid work. Utility is maximized at point i where the conditions  $\frac{U_l}{U_Y} = W$  is satisfied. Hence, the household allocates  $e_1^*$  to the wage work and  $l_1^*$  to leisure. Thus, the effect of microcredit on this household type would be a decrease in total time allocation to work ( $e_1^* + s_1^* < e_1$ ), while leisure, total income, and utility would increase.

For the type-2 household, the Khun Tucker conditions also suggest that time is allocated to the microenterprise only if the microenterprise profit function dominates the paid income line. Given its high preference for leisure, the type-2 household maximizes utility at point f as illustrated in the second panel of figure 4.2. At this solution, the Khun-Tucker

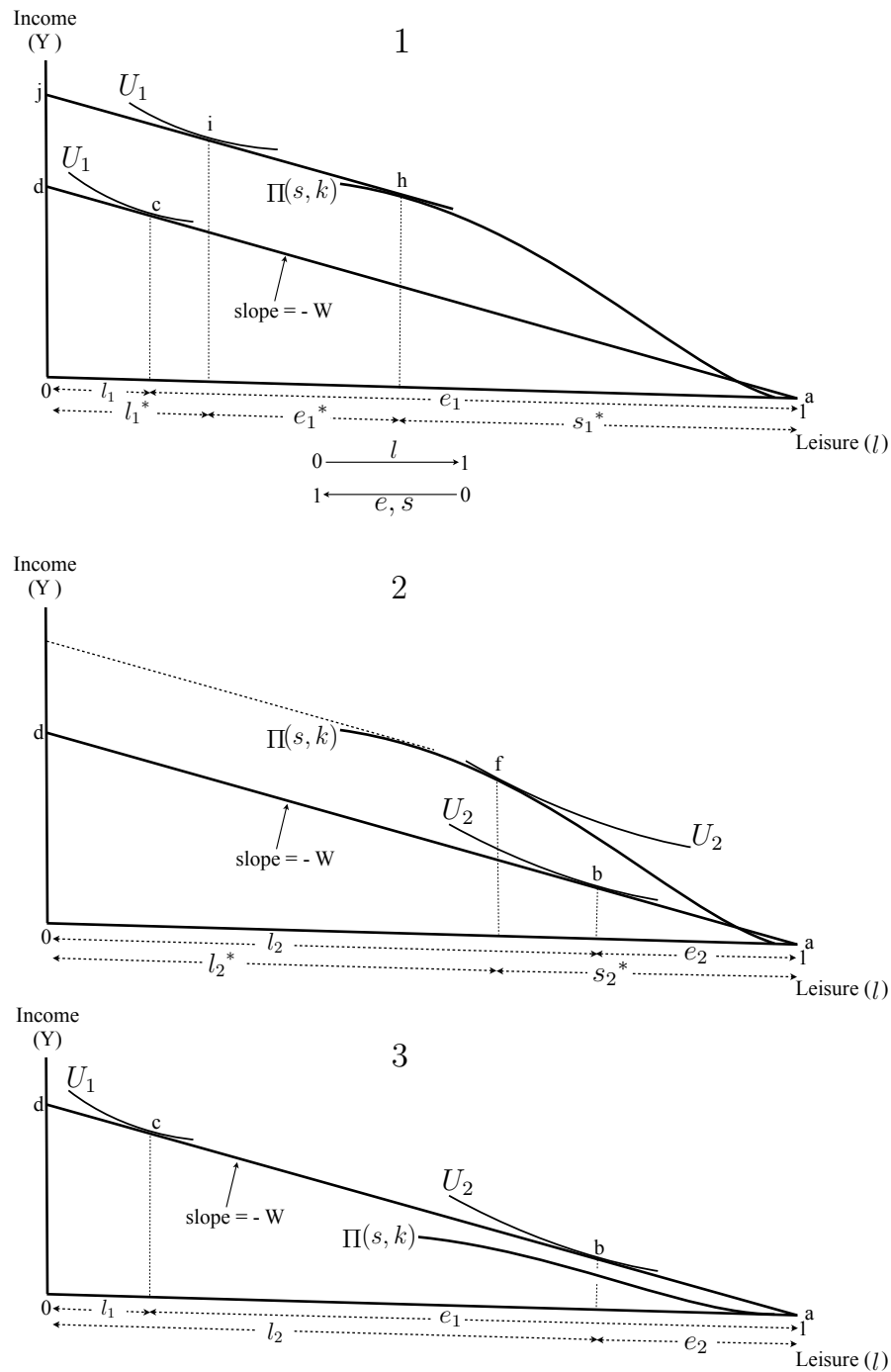


Figure 4.2: Microenterprise Profitability and Households' Time Allocation

conditions above give

$$\Pi_s = \frac{U_l}{U_Y} \quad (4.6)$$

Total time spent working increases from  $e_2$  to  $s_2^*$  while leisure reduces from  $l_2$  to  $l_2^*$ . Therefore,, the effect of microcredit on this household would be a reallocation of all its work time from wage work to the microenterprise, a decrease in time allocated to leisure, while total time spent working, as well as income and utility, would increase.



A third type of solution is suggested by equation 4.4 for the case where the microenterprise profit function is dominated by the paid income line. The loan made available from the microcredit program may be too small as an investment for the household. Or the household may lack requisite managerial skills so its productivity in self-employment is small. In either case, the wage line dominates the microenterprise profit function as shown in the third panel of figure 4.2. The solution suggests the household would allocate all of its work time to the wage work. In other words, the type-1 and type-2 household would remain in full-time paid employment at point c and point b respectively. This is to say, time allocation would be unchanged by the introduction of the microcredit program and these households would self-select out of the MC program.

These results have only been illustrated for households at the extremes of relative preference between work and leisure.<sup>2</sup> It can be expected that households lie everywhere between these extremes and that the time allocation effect of introducing microcredit ranges within the results found for the type-1 and type-2 household. The effect on income is positive for households whose microenterprise profit function dominates their paid wage function, but zero for households who anticipate that the profit function would be dominated by their paid wage function. It is implied that this latter group self-selects out of the program.

### 4.3.3 Marginal Effects of Capital on Time Allocation and Utility

For households that have self-selected into the MC program ( $s > 0$ ), the time allocation effect of a small change in the available loan size may be analyzed. For the type-1 household ( $s_1 > 0$  and  $e_1 > 0$ ), comparative statics results may be obtained by totally differentiating the first-order conditions  $U_Y W - U_l = 0$  and  $U_Y \Pi_s - U_l = 0$  with respect to  $e$ ,  $s$ , and  $k$ . This yields

$$\frac{ds_1^*}{dk} = - \frac{\Pi_{sk}}{\Pi_{ss}} \geq 0 \quad (4.7)$$

$$\frac{de_1^*}{dk} = \frac{\Pi_{sk}(U_{YY}W^2 + U_{ll}) - U_{YY}\Pi_{ss}\Pi_k W}{\Pi_{ss}(U_{YY}W^2 + U_{ll})} \leq 0 \quad (4.8)$$

For a type-2 household ( $s_2 > 0$ ), the only first-order condition is  $U_Y \Pi_s - U_l = 0$  since this household is not engaged in wage work. Totally differentiating this condition with

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<sup>2</sup>The assumptions made in regarding these as extremes are that a household can neither allocate all its time to work (in which case it will live without rest) nor allocate all to leisure (in which case it will live without earnings).

respect to  $s$  and  $k$  gives

$$\frac{ds_2^*}{dk} = -\frac{U_{YY}\Pi_s\Pi_k + U_Y\Pi_{sk}}{U_{YY}\Pi_s^2 + U_Y\Pi_{ss} + U_{ll}} \quad (4.9)$$

The sign on equation (4.9) is positive if its numerator  $U_{YY}\Pi_s\Pi_k + U_Y\Pi_{sk}$  is positive. Thus,

$$\frac{ds_2^*}{dk} > 0 \quad \text{if} \quad -\frac{U_{YY}}{U_Y} < \frac{\Pi_{sk}}{\Pi_s\Pi_k} \quad (4.10)$$

The fraction  $-U_{YY}/U_Y$  measures the degree of concavity of the utility function at income level  $Y$ . At any given income level, the marginal utility of income decreases with increasing concavity of the utility function. Equation 4.10, therefore, suggests that for a type-2 household, the marginal effect of microcredit on time allocation to the microenterprise is positive if at the given income, the household's marginal utility of income is high (i.e., the concavity of  $U$  in  $Y$  is low). This result occurs because the household has a high preference for leisure. Given an initial level of time allocation to the microenterprise, an additional capital would increase the household's income. At a low marginal utility of income, the household prefers to re-allocate some time to leisure thereby forfeiting the income increase that could have been achieved by the added capital.

For each household type, an indirect utility function may be specified as

$$V_1(k) = U[We_1^*(k) + \Pi(s_1^*(k), k), \quad 1 - e_1^*(k) - s_1^*(k)] \quad (4.11)$$

$$V_2(k) = U[\Pi(s_2^*(k), k), \quad 1 - s_2^*(k)] \quad (4.12)$$

The function  $\Pi(s_i^*(k), k)$  is the net profit after both the principal and the interest on the loan has been repaid. The function  $V_1(k)$  and  $V_2(k)$  represent the indirect utility for the type-1 and the type-2 households respectively. Differentiating each indirect utility function with respect to  $k$  yields

$$\frac{dV_1}{dk} = U_{Y_1}\Pi_k \geq 0 \quad (4.13)$$

$$\frac{dV_2}{dk} = U_{Y_2}\Pi_k \geq 0 \quad (4.14)$$

The main results here are as follows. For households who have self-selected into the MC program, the marginal effect of the available loan size on time allocation to the microenterprise depends on the household type. While this effect is always positive for a type-1 household, the direction of effect for a type-2 household depends on its marginal utility of income. If its marginal utility of income is low, the type-2 household would re-allocate some time away from the microenterprise in response to an increase in the size of loan from the MC program. The behaviour of the type-2 household is consistent with its having a higher preference for leisure (than for income). Irrespective of the household type, an increase in the size of the microcredit loan results in an increase in the utility that the household would derive if the loan were invested.

#### 4.3.4 Uncertainty and Households' Time Allocation to Microcredit

These results have so far assumed perfect information about the nature of the microenterprise profit function. In the real world, however, households make an *ex ante* decision to obtain the microcredit and invest in a microenterprise, while profits are realized *ex post*. Therefore, investment decisions can only be made based on the household's expectation of the microenterprise profits.

Mishra and Goodwin (1997) consider the effect of risk aversion for households combining farm work with wage employment. Their analysis can be readily adapted to the type-1 household adopting the microcredit. A risk-neutral type-1 household would allocate labour to equalize  $W$  and the expected  $\Pi_s$ , while a risk-averse type-1 household would discount the expected  $\Pi_s$  and thus allocate labour where the expected  $\Pi_s$  is greater than  $W$ . Following Sandmo (1971) the effect of risk aversion on time allocation by a type-1 as well as a type-2 household can be derived. The microenterprise profit function is assumed to have a probability distribution with an expectation  $\bar{\Pi}(s, k)$ . Details of the analysis are shown in the appendix. The results are illustrated in figure 4.3.

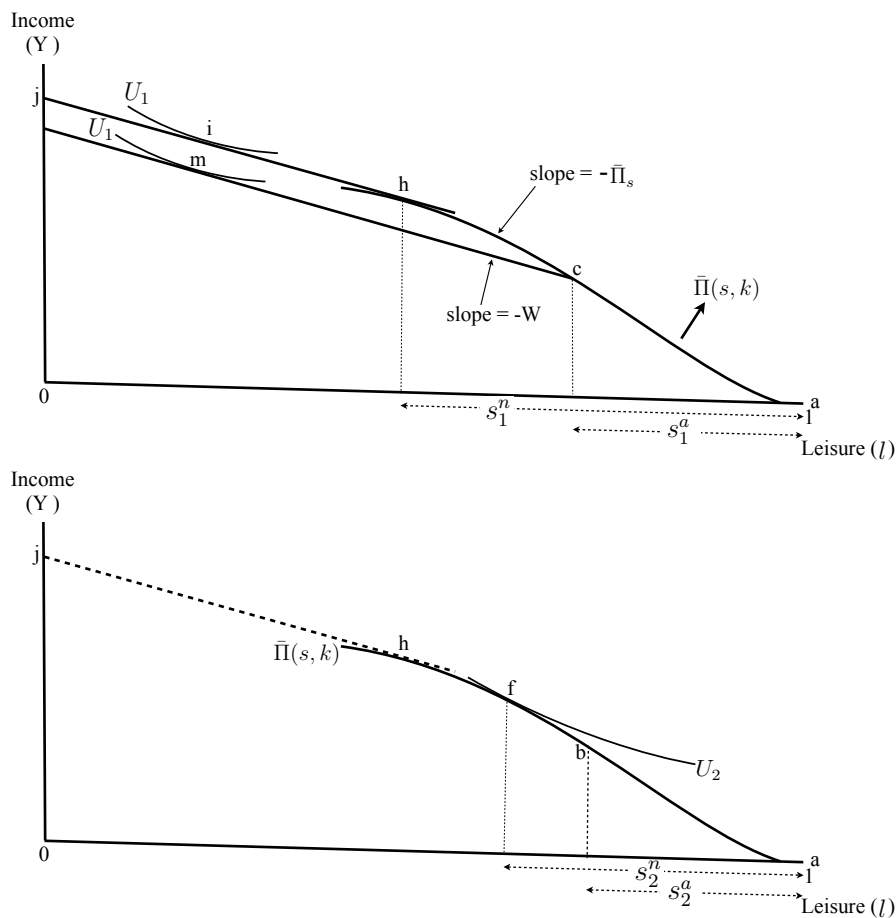


Figure 4.3: Effect of Risk Aversion on Time Allocation to Microcredit

The first panel of the figure is for a type-1 household. The line a–h represents the expectation of the microenterprise profit function  $[\bar{\Pi}(s, k)]$ . A risk-neutral household would allocate  $s_1^n$  to self-employment at which point the paid wage  $W$  and expected microenterprise wage  $\bar{\Pi}_s$  are equalized. Expected utility is maximized at point i. On the other hand, a risk-averse household would allocate only  $s_1^a$  to the microenterprise where  $\bar{\Pi}_s > W$ , and expected utility is maximized at point m.

The second panel of figure 4.3 is for the type-2 household. For a risk-neutral household, expected utility is maximized at point f, where the expected microenterprise wage equals the expected marginal rate of substitution of leisure for income, i.e.,  $\bar{\Pi}_s = \frac{E[U_l]}{E[U_Y]}$ . Hence,  $s_2^n$  is allocated to the microenterprise. For a risk-averse household expected utility is maximized at point b in the region in which  $\bar{\Pi}_s > \frac{E[U_l]}{E[U_Y]}$ , hence only  $s_2^a$  is allocated to the microenterprise.

The conclusion here is that the impact of introducing risk is the same for both the type-1 and the type-2 households. Time allocation to a microenterprise is a decreasing function of the household's degree of risk aversion.

#### 4.3.5 Summary of Results for the Single-Period Model

Overall, the single-period model explains household time allocation to a microenterprise in any given period conditional on the household having self-selected into the microcredit program. Risk-averse households allocate time between the microenterprise and a wage job at a time allocation mix such that the expected marginal profit from the microenterprise equals the wage rate.

The single-period model also suggests that households self-select in the microcredit program only when their anticipated microenterprise profit function dominates their paid income function in the given period. This is to say, that households who self-select into the program always experience an income gain in the given period. This suggestion is not consistent with observations that households participate in the microcredit program even when doing so would result in a short-fall in their current incomes. As already discussed in the introduction, some microcredit borrowers have lower per-hour earnings from their microenterprise than they do from paid work (Spalter-Roth et al., 1994; Frankiewicz, 2001). In a study of 405 microcredit users in the United States, only 50% of the households made a profit in a normal month, 10% broke even, while 40% made a loss [cited in Schreiner (1999)].

Therefore, while the single-period model explains time allocation in a given period con-

ditional on the households having self-selected into the microcredit program, it does not explain households' self-selection into the program.

## 4.4 Role of Sequential Lending

It could be argued, in theory, that for households making a loss by their use of microcredit, self-selection into the program may have been based on an erroneous belief about the profitability of the venture. Households may lack the requisite skills to accurately estimate the expected profits before making a decision to obtain and invest the microcredit. Thus, the *ex post* profits realized from the venture may be lower than the households had estimated *ex-ante*. However, there seems to be an alternative explanation to why households who make a loss do not *ex-ante* self-select out of the program. Their behaviour may be due to the sequential lending attribute of microcredit programs.

In a 2008 interview of seven participants in Vancity's Peer Lending Program, four of them who were first-time borrowers reported their microenterprises were not profitable enough to repay the invested loans.<sup>3</sup> For three of them, repayment funds came from some paid employment, while the fourth relied on government social assistance benefit. One of them specifically reported being worse off as a result of participation in the microcredit program. His experience is best summarized in his own words:

Oh, financial situation is not very good.... If only I can pay my loan, I will be very happy. I work for a few hours here and there just to manage to pay debts. But I don't really mind right now because there is prospect now.... The impact on my family is that – it affected them a bit because I don't send the kind of money I used to send when I was just working [in paid employment]. Now the money they get from me is not much, but at least I explained to them that I am doing something, please be patient a bit. It is a bit of inconvenience for them at the moment.

Yet this respondent was willing to continue in the program. His reported motivation for applying to the program in the first place was beyond the desire to increase household incomes in the current term. Rather, it was a strategic means of accessing a much larger loan later as can be inferred from his comment,

I applied because it is a very good program; because if you finish paying your loan they give you another one, you pay, they give you another, incrementally.

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<sup>3</sup>Vancity Peer Lending Program is one of the microcredit programs in Canada. It is administered by Vancity Credit Union in Vancouver, BC.

Another respondent commented,

My loan payments I have, my plan was like pay all these with Vancity, and get the line of credit

Additionally, one of the participants who had joined the program with a very poor credit score three years before the interview date commented,

I think that when I finish paying this loan, I will be okay. Like I think if I talked to Vancity, they would give me the line of credit.

It appears, therefore, that participation in the MC program is motivated by factors beyond the desire to experience an immediate increase in household income. As submitted by the respondents quoted above, current participation may be motivated by the anticipated effect of facilitating the household's future access to larger and more productive loans. Indeed, MC programs (particularly those that use the peer-lending technique) typically disburse their loans at five levels. With peer lending programs, first-time borrowers get \$500 or \$1,000, while returning borrowers get a "next loan" in a pre-specified increment over the previous, up to a maximum loan amount of \$5,000 (Servon and Bates, 1998). Additionally, one of the objectives of MC programs is to provide households with an opportunity to acquire a credit history, which could be used to acquire larger loans in the future (Frankiewicz, 2001). Thus, households that self-select into the program may be maximizing utility over multiple periods rather than what is assumed by the single-period model above. The following section develops a two-period model to capture the role of sequential lending on households' time allocation to microcredit.

## 4.5 A Model of Households' Time Allocation in a Two Period Game

Assume the given household lives in two periods, the present and the future. In each period, the household may decide to participate (or not participate) in the microcredit program. If the household decides to borrow in the current period, it gets a first loan in the amount of  $\bar{k}$  dollars. In the next period, the household would be eligible for a higher loan in the amount of  $2\bar{k}$  dollars by virtue of having successfully borrowed and repaid the microcredit  $k$  in the first period. Note that this loan in period 2 may not necessarily be from an MC program since the household may have accumulated some credit history from its first period use of the microcredit  $\bar{k}$ , and now be able to access traditional sources of loans. On the other hand, the household would get only the microcredit  $\bar{k}$  in the second period if it does not participate in the program during the first period. Assume there are

no strategic defaults or delinquencies by the participating household.

The household's alternative strategies and outcomes are illustrated in figure 4.4. If the household borrows in the first period, it is at node a. However, borrowing in the first period does not always indicate the household has the intention of investing the loan. It may have borrowed the first loan as a strategy to access the next, which would constitute a bigger and more productive investment. Thus, at node a, the household may either invest the  $\bar{k}$  dollars in some microenterprise or not invest.

On the one hand, the household would be at node c if the  $\bar{k}$  dollars are invested. Assume the loan in period 1 was used to purchase some business equipment such as a sewing machine, video recording equipment, hair dryer, or any other type of business asset in the amount of  $\bar{k}$  dollars. The household continues to use this equipment over the period while making repayments of the loan and interest to the lender. The maximized utility in self-employment is  $V(\bar{k})$ . This utility is derived from time spent on leisure, earnings from a wage job, if any, as well as profit from the microenterprise after the microcredit loan and interests have been repaid.

On the other hand, the household would be at node d if it borrowed but did not invest the current loan. With a total interest charge  $r$  on the loan, the household makes a repayment of  $R = \bar{k} + r$  to the lender, while it continues to live on full time paid employment. The maximized utility from this strategy may be denoted as  $V(0|_{MC})$  — that is the utility gained in full time paid employment  $V(0)$ , given the expenditure incurred from having participated in the MC program. Thus, the maximized utility  $V(0|_{MC})$  at node d is less than  $V(0)$ .

As a third option, the household may have decided not to obtain any microcredit in the first period in which case it is at node b. At this node it relies on full time paid employment, deriving utility  $V(0)$ .

In period 2, borrowing as a strategy for accessing future loans does not obtain since this is the terminal period in the household's lifespan. Therefore, it is assumed that the household will not borrow in period 2 unless it intends to invest the loan. Conditional on having successfully borrowed and repaid the microcredit  $\bar{k}$  in the preceding period, the household would get  $2\bar{k}$  dollars if it applied for a loan in the second period. This loan may be a next loan from the microcredit program, or the household may have acquired enough credit history to be able to access other sources of business loans.

However, its period 2 utility would depend on whether or not it had invested the microcredit loan it borrowed in the preceding period. If the preceding period's microcredit was invested, then by the beginning of the second period the household would already have

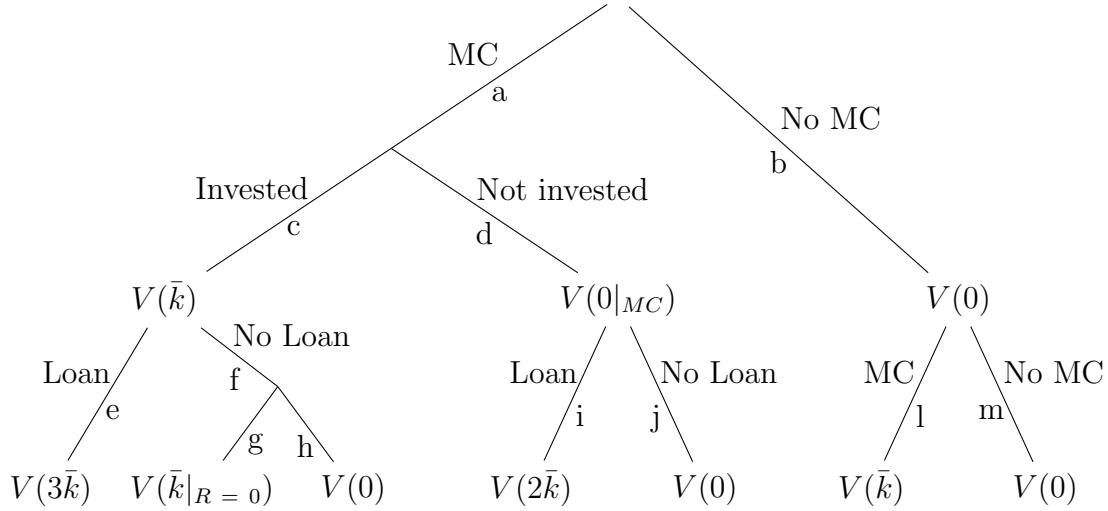


Figure 4.4: Decision Tree under Sequential Lending Model

business capital (equipment) worth of  $\bar{k}$  dollars (assuming there is no depreciation).<sup>4</sup> Hence, if it borrows the next loan of  $2\bar{k}$  in the second period (node e), it has a total capital of  $3\bar{k}$  and the maximized utility from having invested  $3\bar{k}$  worth of capital in self-employment is  $V(3\bar{k})$ . The utility  $V(3\bar{k})$  would derive from time spent on leisure, earnings from a wage job, if any, as well as profit from the microenterprise after the microcredit loan ( $2\bar{k}$ ) and interests have been repaid.

On the other hand, a household which invested  $\bar{k}$  in the first period may decide not to obtain any loan in the second (node f). In such a case, it may continue in self-employment on its existing  $\bar{k}$  assets (node g). At this node this household has no loan repayment to make since the loan used in purchasing the capital  $\bar{k}$  has already been repaid in the first period. Therefore, its utility derives from time spent on leisure, earnings from a wage job, if any, as well as profit from the microenterprise. This utility is denoted as  $V(\bar{k}|_{R=0}) \geq V(\bar{k})$ . The sub-notation  $R = 0$  indicates that the household does not make any repayment at this node since the microcredit  $\bar{k}$  has already been repaid in the previous period.<sup>5</sup> Alternatively, the household at node f may decide to abandon self-employment

<sup>4</sup>The results would not change if rather than assume the first period loan was used to purchase some business equipment, it is assumed instead that it was used as working capital. In either case, the household would have acquired some business advantages as of the beginning of period 2, from having been in business over the preceding period. Such advantages may, for instance, be from business experience, or from established networks within the given industry, or from appreciation of the past period's investment. This advantage in physical and/or human capital may be loosely represented by  $\bar{k}$ , without causing any bias in the model outcome.

<sup>5</sup>The reader should understand that in any period in which the loan is borrowed (nodes c and e as well as nodes i and l to be considered soon), the utility outcome results from profit which is net of repayment  $R$  of the principal and interests.



and rely fully on paid work (node h) for which the maximized utility is  $V(0)$ .

Conditional on having obtained the first loan without investing it in the first period (node d), the household in period 2 may decide not to obtain the next loan, choosing instead to continue in full-time paid employment (node j). If it borrows the next loan of  $2\bar{k}$  (node i), its maximum utility is  $V(2\bar{k})$ . This utility is derived from time spent on leisure, earnings from a wage job if any, as well as profit from the microenterprise after the microcredit loan and interests have been repaid.

As a third option, the household may have decided not to obtain any loan in the first period (node b) in which case it lives only on paid employment. In the second period, it may again decide not to borrow (node m) so that its utility remains at  $V(0)$ . If it borrows in the second period (node l), it gets only  $\bar{k}$  dollars since that would be the first time it is participating in the program. Again, this household will not obtain the loan in the terminal period unless it intends to invest it. Thus, at node  $l$ , the household invests  $\bar{k}$  dollars and derives the maximum utility  $V(\bar{k})$ .

Note that since  $\frac{dV}{dk} \geq 0$ , it must be true that  $V(3\bar{k}) \geq V(2\bar{k}) \geq V(\bar{k})$ . If the size  $\bar{k}$  of the current loan is large enough such that  $V(\bar{k}) > V(0)$ , then the household will always self-select into the program since doing so will increase its utility above what it can get under full time paid employment. On the other hand, if  $\bar{k}$  is so small, such that  $V(0) > V(3\bar{k})$ , the household will always self-select out of the program since participation can neither improve its utility in the current period nor in the future. Thus, the decisions in each period would be similar to the single period game if  $V(\bar{k}) > V(0)$  or if  $V(0) > V(3\bar{k})$ .

Consider the case where  $V(\bar{k}) < V(0) < V(3\bar{k})$ . In other words, a household could derive less utility from the current loan than it would under full-time paid employment, but more utility from its next loan and accrued investments than it would from future full-time paid employment. Assume also that the anticipated next loan  $2\bar{k}$  is big enough, such that the payoff from the next loan and accrued investment would exceed the payoff from accrued investment alone (that is,  $V(3\bar{k}) > V(\bar{k}|_R = 0)$ ).<sup>6</sup>

The household's decision may be solved by backward induction. Conditional on the household choosing "No MC" in the first period (node b),  $V(\bar{k}) < V(0)$  implies the household would prefer the second period payoff at node m to the payoff at node l. Thus, node l is eliminated from the possible decisions. Additionally, nodes h and g would be eliminated, one after the other, since the payoffs  $V(0)$  and  $V(\bar{k}|_R = 0)$  are each less than the payoff at node e. Figure 4.5 shows the decision tree without the eliminated strategies and

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<sup>6</sup>This latter assumption is consistent with MC participants seeking to access the next loan as revealed in the interviews with Vancity MC borrowers.

outcomes.

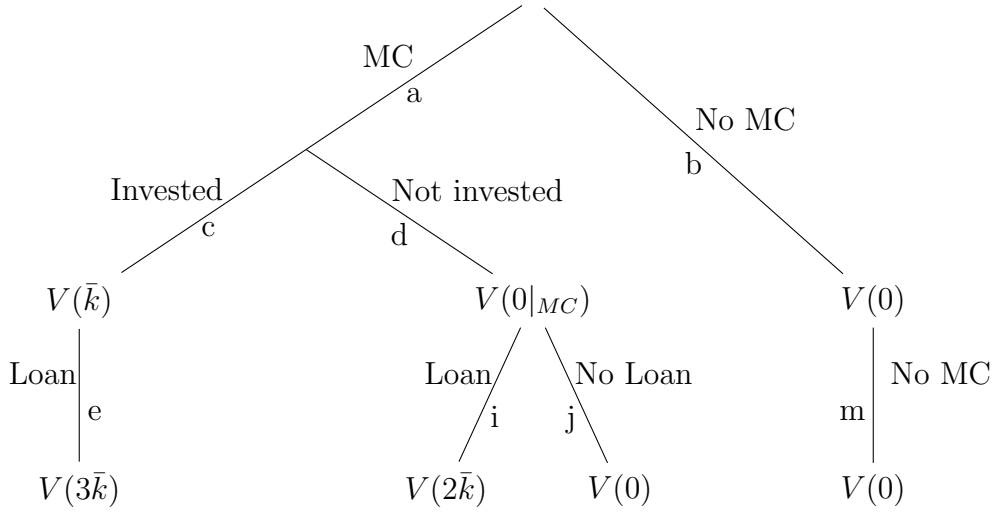


Figure 4.5: Decision Tree under Sequential Lending Model

If  $V(2\bar{k}) < V(0)$ , then the household would not obtain microcredit unless it intends to invest it — node i would be inferior to j, the path a–d–j would be inferior to path b–m and would therefore be deleted from consideration.

A more interesting scenario arises if  $V(2\bar{k}) > V(0)$ . That is, if the anticipated next loan is big enough to yield utility in self-employment, in excess of what would be derived in full-time paid employment. Node j would be eliminated since node i is preferred. In the current period therefore, the household would have three alternative paths to choose from. Henceforth, path a–c–e with invested microcredit will be labeled IMC, path a–d–i with strategic borrowing will be labeled SMC and path b–m with no microcredit will be labeled NMC. The maximum utilities on paths IMC, SMC and NMC are respectively

$$V_{IMC} = V(\bar{k}) + \delta V(3\bar{k}) \quad (4.15)$$

$$V_{SMC} = V(0|_{MC}) + \delta V(2\bar{k}) \quad (4.16)$$

$$V_{NMC} = V(0) + \delta V(0) \quad (4.17)$$

The parameter  $\delta$  is a household-specific discount factor (time preference rate).

$$\delta = \frac{1}{1 + \tau} \quad (4.18)$$

where  $\tau$  is a household-specific discount rate. Thus,  $\delta \in (0, 1)$  can be thought of as a differentiating characteristic of households.

Equations 4.15 through 4.17 can be illustrated as functions of  $\delta$ . As illustrated in figure 4.6, it is possible to have a case where both  $V_{SMC}$  and  $V_{IMC}$  are completely dominated

by  $V_{NMC}$  for all feasible values of  $\delta$ . In such a case there would be complete nonadoption of microcredit. This could happen when the anticipated benefits from future loans are so small, such that even households with very high discount factors would not deem it worth the trouble of borrowing the current microcredit that would bring about a short-fall in current utility.

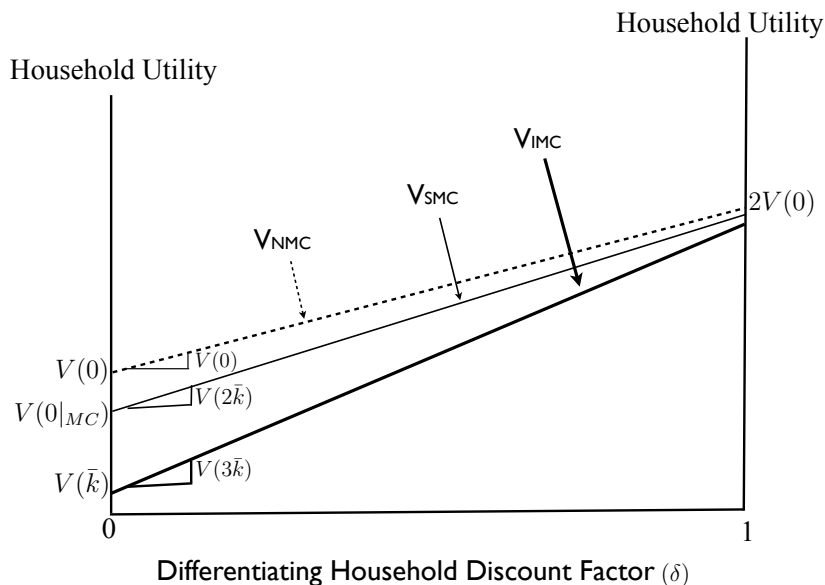


Figure 4.6: The Case with Complete Non-adoption of Microcredit

On the other hand, it is possible to have a case where  $V_{SMC}$  and  $V_{IMC}$  dominates  $V_{NMC}$  for some households, as illustrated in figure 4.7. This is the case of partial adoption of microcredit that is widely experienced by microcredit programs. Within figure 4.7 all households with  $0 \leq \delta \leq \delta'$  will not obtain microcredit, where

$$\delta' = \frac{V(0) - V(0|_{MC})}{V(2\bar{k}) - V(0)} \quad (4.19)$$

Households with  $\delta' \leq \delta \leq \delta^*$  will obtain and not invest microcredit, where

$$\delta^* = \frac{V(0|_{MC}) - V(\bar{k})}{V(3\bar{k}) - V(2\bar{k})} \quad (4.20)$$

And households with  $\delta^* \leq \delta \leq 1$  will obtain and invest the loan.

The multi-period model, therefore, indicates that households may not always self-select out of microcredit programs on account of the microcredit being small. Provided its discount factor is high enough, a household which anticipates an increased benefit from having future access to larger loans, would obtain the current microcredit loan in a bid to access such loans in the future. This two-period model may now be used to consider the effect of specific variables on the demand for microcredit among a given population.

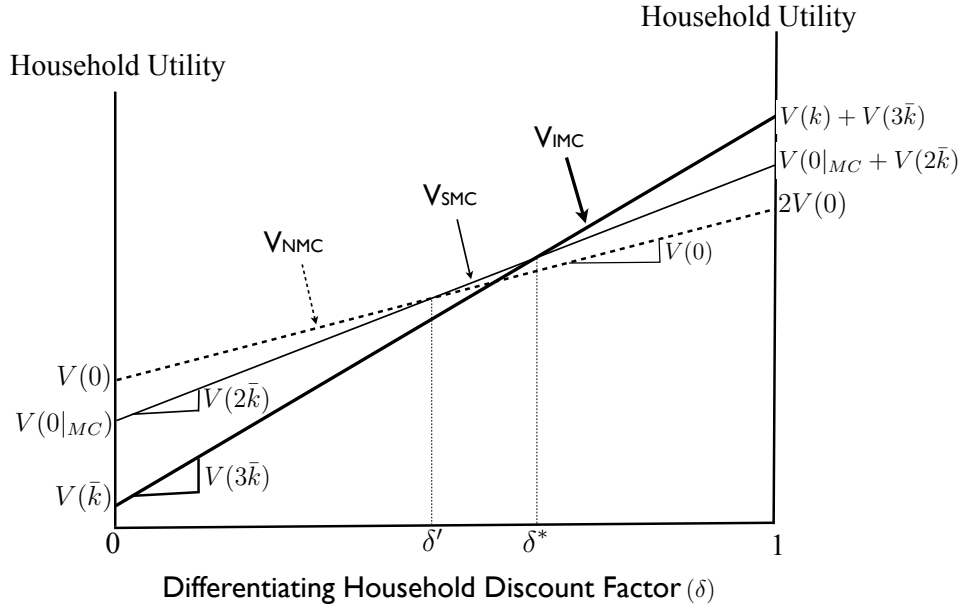


Figure 4.7: The Case with Partial Adoption of Microcredit

#### 4.5.1 Effect of the Current Cost of Borrowing

An increase in the cost of borrowing would reduce the intercept  $V(0|_{MC})$  in figure 4.7 above. Consequently,  $\delta'$  would increase indicating that more households would prefer not to borrow. Also  $V(\bar{k})$  would decrease since increased cost implies that the microinvestment has become less profitable. The overall effect on  $\delta^*$  of a simultaneous change in  $V(0|_{MC})$  and  $V(\bar{k})$  is, however, not immediately obvious. A decrease in  $V(0|_{MC})$  decreases  $\delta^*$  while a decrease in  $V(\bar{k})$  increases  $\delta^*$ . The overall change in  $\delta^*$  would depend on the size of the effect which cost of borrowing has on the microenterprise's profitability. If the absolute value of this effect is high, then with an increase in the cost of borrowing, the decrease in  $V(\bar{k})$  could exceed that of  $V(0|_{MC})$  and  $\delta^*$  would increase. An increase in  $\delta^*$  would mean that fewer households invest the microcredit loan.<sup>7</sup>

#### 4.5.2 Effect of the Size of the Anticipated Future Loan

In the above model,  $2\bar{k}$  represents the size of the future loan which a household anticipates from its current participation in the microcredit program. In figure 4.7, the effects of a marginal change in the size of the future loan can be considered as changes in the slopes of  $V_{SMC}$  and  $V_{IMC}$ . Equations 4.13 and 4.14 had shown that  $\frac{dV}{dk} \geq 0$  implying  $V(3\bar{k}) \geq V(2\bar{k})$ . Thus,  $\frac{dV}{dk}$  evaluated at  $2\bar{k}$  must be greater or equal to  $\frac{dV}{dk}$  evaluated at  $3\bar{k}$  to satisfy the concavity property of utility functions. It follows that while a marginal

<sup>7</sup>The reverse could hold if the effect of cost of borrowing on the microenterprise profitability is small.

increase in the size of the future loan would rotate both  $V_{SMC}$  and  $V_{IMC}$  leftward, the rotation in  $V_{SMC}$  would be greater than or equal to the rotation in  $V_{IMC}$ . Consequently,  $\delta^*$  would increase. Additionally, with the slope of  $V_{NMC}$  unaffected,  $\delta'$  decreases. Therefore,, holding other factors constant, an increase in the size of the future loan anticipated by households results in an increase in the number of households engaged in strategic borrowing, a decrease in the number of households who invest the current MC, and a decrease in the number of non-borrowers.

### 4.5.3 Effect of the Investment Appreciation Rate

The investment appreciation rate refers to the amount of business capital and advantages which the current  $\bar{k}$  dollars of investment can generate over the period. This model has assumed an investment appreciation of  $\bar{k}$  over the period (see footnote 4 of this chapter). Therefore, the available investment in the second period is this initial  $\bar{k}$  plus the  $2\bar{k}$  of loan borrowed in the second period. An increase in the investment appreciation rate would increase the slope  $V(3\bar{k})$  of  $V_{IMC}$ , resulting in a decrease in  $\delta^*$ . Therefore, fewer households would engage in strategic borrowing (preferring instead to invest the loan). At some very high rate of appreciation,  $\delta^*$  is small and all households who were initially on strategic borrowing, as well as some of those who had preferred no MC, would prefer to invest the microcredit loan.

## 4.6 Conclusion and Policy Implications

This paper shows how a household that has the option of both paid and self-employment can maximize utility by allocating some of its time to self-employment. In any given period, a household's time allocation to the microenterprise is negatively affected by its wage in paid employment, its degree of risk aversion, and its relative preference for leisure. The effect of the amount of capital available from the microcredit program depends on the household type. It is positive for households with a low relative preference for leisure. For households whose relative preference for leisure is high, the marginal effect of capital on time allocation to the microenterprise is negative (positive) if the household's marginal utility of income is low (high). Results of analyzing time allocation under a single-period framework suggests a household self-selects into the microcredit program only if it anticipates that such action would increase its income in the short run.

In contrast, empirical evidence suggests that households who anticipate a short-run decrease in income due to microcredit may also self-select into the program. Sequential

lending plays an important role in households' use of microcredit. Sequential lending means that a household's current use of microcredit gives it access to greater funds in the future. Therefore, a model of household time allocation is developed using a multi-period framework. The model explains why households do not always self-select out of the microcredit program on account of the microenterprise being less profitable than their wage jobs. If the discounted benefit of accessing the future loans is high enough, a household may self-select into the microcredit program and bear the current short-fall in incomes (and utility) so as to be able to access the future loans. The likelihood of self-selecting into the microcredit program is positively influenced by the size of the loan, the future streams of loans anticipated from current participation, the investment appreciation rate, and the household's discount factor. This likelihood is negatively influenced by the households' wage rate in paid employment, as well as by the costs of borrowing. Under certain conditions, the household — in a bid to access a future loan — might borrow money in the short run and repay it without having invested it in a microenterprise.

Given the predicted effect of sequential lending on the demand for microcredit, the persistent low demand faced by the programs in the United States and Canada could partly be a result of most households having a low discount factor, such that they ignore all future streams of benefits that could accrue from current participation. Alternatively, it may be the case that the future benefits are themselves too small, so even households with high discount factors do not consider these benefits as sufficient incentive for current participation. Additionally, it may be the case that the financial and transaction costs of accessing the current microcredit are too high, to the extent that they erode any benefits that could accrue to the household in the future. Lastly, it is possible that households have no awareness (or have a mistaken anticipation) of the size of future benefits.

Empirical analysis is needed to determine if a change in any one of these variables would have a statistically and/or economically significant impact on the demand for microcredit among any given population of eligible participants. Thus, one of the contributions of this paper is in providing a theoretical framework for such empirical investigation. If needed, a policy which increases the size of the subsequent loans that can be borrowed due to past participation in MC programs would have the effect of increasing the future streams of benefit and provide more incentive for current participation. Programs that improve households' awareness of the future benefits of current participation may increase the demand for microcredit.

It is implied that any policy to improve households' productivity in a microenterprise would also increase the demand for microcredit. Such a policy would increase the number of households whose microenterprise profit dominates their paid wages, and decrease the

critical discount factor above which households participate in the MC program. Another issue that would be worthy of empirical investigation is, whether or not increased investment in skill development and self-employment training programs leads to a higher demand for microcredit.

## 4.7 Appendix

### 4.7.1 Derivation of the Results in Figure 4.3

Given uncertainty as assumed in section 4.3.4, the results in figure 4.3 are derived following the technique in Sandmo (1971). The effect of risk aversion on time allocation by each household type is analysed by comparing time allocation when the households are assumed to be risk neutral with the allocated time when they are assumed to be risk averse. Given uncertainty, the profit function  $\Pi(s, k)$  is a gamble with a probability distribution and a mean.

#### With Risk Neutrality

Let the profit function  $\Pi(s, k)$  be randomly distributed with a probability density  $f[\Pi(s, k)]$  and a mean;  $\bar{\Pi}(s, k)$ . Since for a risk-neutral household, expected utility of a gamble is the same as utility of expected gamble, the households maximize

$$\begin{aligned} \text{Max}_{e, s} \quad & E[U] = U(We + \bar{\Pi}(s, k), \quad 1 - e - s) \end{aligned} \quad (4.21)$$

Results are thus similar to the case with complete information except that the profit function known with certainty is replaced in the current case by the expected profit function  $\bar{\Pi}(s, k)$ . Specifically at the optimum allocation of time, the expected marginal rates of substitution are

$$\frac{E[U_l]}{E[U_Y]} = W = \bar{\Pi}_s \quad \text{and} \quad \frac{E[U_l]}{E[U_Y]} = \bar{\Pi}_s > W \quad (4.22)$$

for type-1 and type-2 households respectively.

#### With Risk Aversion

For a risk-averse household, the condition  $E[U] = U(We + \bar{\Pi}(s, k), \quad 1 - e - s)$  does not hold. As a matter of fact, expected utility of the gamble would be less than utility of

expected gamble. The household's objective function is therefore better stated as,

$$\begin{aligned} \text{Max}_{e, s} \quad & E[U] = E[U(We + \Pi(s, k), 1 - e - s)] \end{aligned} \quad (4.23)$$

And the first-order conditions for a type-1 household using microcredit are

$$WE[U_Y] - E[U_l] = 0 \quad (4.24)$$

$$E[U_Y \Pi_s] - E[U_l] = 0 \quad (4.25)$$

It follows immediately from 4.24 that

$$\frac{E[U_l]}{E[U_Y]} = W \quad (4.26)$$

For a type-2 household, the first-order condition is

$$E[U_Y \Pi_s] - E[U_l] = 0 \quad (4.27)$$

Equation 4.25 for the type-1, as well as 4.27 for the type-2 household require a little more algebra to arrive at the relationship between  $\frac{E[U_l]}{E[U_Y]}$  and  $\bar{\Pi}_s$  for the each household type. But these equations are essentially the same and, therefore, it suffices to work through the algebra of only one of the equations.

In either of equations 4.25 and 4.27 move  $E[U_l]$  across the equality sign to get

$$E[U_Y \Pi_s] = E[U_l]$$

Then, subtract  $E[U_Y \bar{\Pi}_s]$  from both sides of the equation and rearrange to get

$$E[U_Y (\Pi_s - \bar{\Pi}_s)] = E[U_l] - E[U_Y \bar{\Pi}_s] \quad (4.28)$$

Since it is true that

$$Y = E[Y] + [\Pi(s, k) - \bar{\Pi}(s, k)] \quad (4.29)$$

it is also true that  $Y \geq E[Y]$  if  $\Pi(s, k) \geq \bar{\Pi}(s, k)$  and therefore,

$$U_Y \leq U_{E[Y]} \text{ if } \Pi(s, k) \geq \bar{\Pi}(s, k). \quad (4.30)$$

But it is also true that  $\Pi(s, k) \geq \bar{\Pi}(s, k)$  implies  $\Pi_s \geq \bar{\Pi}_s$ . Thus, 4.30 may be restated as

$$U_Y \leq U_{E[Y]} \text{ if } \Pi_s \geq \bar{\Pi}_s \quad (4.31)$$

Therefore,

$$U_Y (\Pi_s - \bar{\Pi}_s) \leq U_{E[Y]} (\Pi_s - \bar{\Pi}_s) \quad (4.32)$$



The inequality in 4.32 always holds true even for  $\Pi_s \leq \bar{\Pi}_s$ . For in such a case, 4.29 would mean  $Y \leq E[Y]$ , so that  $U_Y \geq U_{E[Y]}$ . Then multiplying each side by  $(\Pi_s - \bar{\Pi}_s)$ , which is negative, would reverse the inequality so that the condition in 4.32 is preserved. Now, taking expectation of both sides of 4.32, and noting that  $E[Y]$  is a constant gives

$$E[U_Y(\Pi_s - \bar{\Pi}_s)] \leq U_{E[Y]}E[\Pi_s - \bar{\Pi}_s] \quad (4.33)$$

Notice that  $E[\Pi_s - \bar{\Pi}_s]$  equals zero. Thus, equation 4.33 means

$$E[U_Y(\Pi_s - \bar{\Pi}_s)] \leq 0 \quad (4.34)$$

It follows, therefore, that the expression on the right hand side of 4.28 is less than or equal to zero

$$E[U_l] - E[U_Y \bar{\Pi}_s] \leq 0 \quad (4.35)$$

This yields

$$\frac{E[U_l]}{E[U_Y]} \leq \bar{\Pi}_s \quad (4.36)$$

Thus, at the optimal time allocations for the type-1 household, equations 4.24 and 4.25 collectively give

$$\frac{E[U_l]}{E[U_Y]} = W \leq \bar{\Pi}_s \quad (4.37)$$

as depicted in the first panel of figure 4.3. For the type-2 household, equation 4.27 gives

$$\frac{E[U_l]}{E[U_Y]} \leq \bar{\Pi}_s \quad (4.38)$$

as shown in the second panel of figure 4.3

## Chapter 5

# Income Assistance and Households' Participation in Microcredit Programs

### 5.1 Introduction

In this chapter, the multi-period model of household time allocation to a microenterprise as developed in the preceding chapter is applied for income assistance recipients. The model shows why an IA recipient facing a 100% earnings tax rate may self-select into a microcredit program and allocate time to a microenterprise as against the traditional theory of work disincentive at a 100% earnings tax rate.

The work disincentive from income assistance (IA) has traditionally been analyzed using a single-period, household-utility maximization framework (Moffitt, 1992; Hum and Simpson, 1993; Danziger et al., 1981). The disincentive is known to arise from the guaranteed amount and the offsetting tax rate on the IA program. The guaranteed amount is the benefit to which a household would be eligible if it had no other income. As the household's income from other sources increases, part (or all) of it is clawed back from the guaranteed amount at a pre-specified rate. This is effectively a tax rate on the household's earned (and unearned) income. The guaranteed amount has an income effect on labour supply, while the tax rate produces both an income and a substitution effect. The total effect is a reduction in the number of hours worked by an IA recipient relative to a situation with no IA. At a 100% tax rate, labour supply is predicted to be zero for households eligible for IA benefits (Moffitt, 2003; Friedman, 1962).

With respect to households in self-employment, the work disincentive from IA implies a reduction in the demand for production inputs. Low-income households are eligible for business loans from microcredit (MC) programs. Many of these households are already receiving monthly benefits from government IA programs (Schreiner, 1999; Wehrell, 2002).

Notably, the low demand for MC in the United States and Canada is partly blamed on the disincentive effect of IA (Coyle and Wehrell, 2006; Frankiewicz, 2001; Taub, 1998). Going by the traditional single-period models, households receiving IA with a 100% earnings tax rate should not take up microcredit unless it would generate enough income to enable a break away from IA. In other words, there should be no observation of a household simultaneously participating in an MC program and an IA program with a 100% tax rate.

In contrast, empirical evidence suggests a 100% tax rate on the IA program may not eliminate the beneficiary's incentive to take up a microcredit loan, even when such loan would not induce a break away from the IA program. For instance in a review of 94 loan application forms of returning borrowers on Vancity's microcredit program, 36 forms belonged to households who were participants in British Columbia's Income Assistance (BCIA) program as well as self-employed on the microenterprise they had set up with an earlier borrowed microcredit. The BCIA program applies a 100% tax rate to the earnings of its beneficiaries. Obviously, the work disincentive from IA is weaker than predicted by the traditional model.

This observation of a less-than-predicted disincentive is not not unique to the borrowers of Vancity's MC program. Studies of the earliest IA programs — often called Guaranteed Annual Income (GAI) Experiments — have had to contend with similar findings. The GAI plans were similar to modern day IA programs to the extent that the benefits calculation rule comprised of a guaranteed amount and an offsetting tax rate. Each of the GAI experiments was of limited duration with the longest program lasting only five years. In analyzing the effects of the guaranteed amount and tax rate on labour supply by beneficiary households, Hum and Simpson (1993) (p. S287 ) conclude

If we were asked to summarize “in 25 words or less” what has been learned from the experiments about the economic effects of a GAI plan we would respond: “Few adverse effects have been found to date. Those adverse effects found, such as work response, are smaller than would have been expected without experimentation.”

Although welfare stigma has been proposed as one factor moderating the work disincentive from IA ((Moffitt, 1983; Monroe and Tiller, 2001), stigma does not explain the “partial dependence” on IA as observed among the MC borrowers. Partial dependence means a household gets a fraction of its total income from IA benefit and the remainder from a microenterprise (or a wage job). Stigma arises mainly from the act of IA reciprocity per se and does not vary with the fraction of total income that is from IA (Moffitt,

1983).

The duration of assistance has also been shown to affect the work disincentives from the guaranteed amount and offsetting tax rate on the IA program (Metcalf, 1973). An IA program of permanent duration is associated with less work disincentive than one of temporary duration. The analysis suggests that the labour supply decisions of IA recipients in a current period are based on maximizing the sum of current and future period utility rather than the utility of the current period alone.

This chapter proposes that the decision to take up microcredit by IA recipients facing a 100% earnings tax rate can be explained by a multi-period utility maximization framework. Given the sequential lending attribute of MC programs an IA recipient facing a 100% earnings tax rate may decide to invest the MC in the current period and have its entire profit clawed back from the guaranteed amount, just so to be able to access a larger loan at a future period to generate earnings above the IA eligibility limit. The multi-period model developed in chapter 3 may therefore be applied to income assistance recipients.

The rest of this chapter is organized as follows. Section 5.2 reviews the traditional model of work disincentive from income assistance with respect to time allocation to microcredit. The model is shown to imply a complete nonadoption of microcredit among IA recipients facing a 100% earnings tax rate. Section 5.3 applies the multi-period model developed in chapter 4 in explaining the observed partial adoption of microcredit among these IA recipients. Effects of specific variables on the IA program are considered. Section 5.4 gives a summary of the results.

## 5.2 Microcredit and the Traditional Model of Work Disincentive from Income Assistance

The traditional model of work disincentive from income assistance is a single period model. The model assumes each household faces a constant wage rate (Christofides et al., 1997; Moffitt, 2002). The model specifies a generic benefit calculation rule on the IA program as

$$B = g - t(Wh + N) \quad (5.1)$$

The variable  $B$  is income assistance benefit;  $g$  is the guaranteed benefit paid to households with no earnings;  $0 < t \leq 1$  is a tax rate applied to earnings;  $W$  is the constant wage rate;  $h$  is time allocated to work; and  $N$  is unearned income. Total income is the sum of the benefit  $B$ , earned income  $Wh$ , and unearned income  $N$ . The household which is

assumed to maximize utility over income and leisure, chooses  $h$  such that the effective wage rate  $(1 - t)W$  equals the marginal rate of substitution of leisure for income. This model is appropriate for households supplying labour to paid work alone.

Since the article by Gronau (1977), it has been established that households may simultaneously supply labour to paid work and self-employment, where profit from self-employment exhibits diminishing returns to time allocation. Therefore, in applying the traditional model with respect to time allocation to microcredit, the work hours  $h$  is disaggregated into time allocation ( $e$ ) to a paid work and time allocation ( $s$ ) to a microenterprise. Assuming a household has no unearned income, its IA benefit would be

$$B = g - t[We + \Pi(s, k)] \quad (5.2)$$

The parameter  $W$ , therefore, represents the wage rate in paid employment;  $\Pi(s, k)$  is the microenterprise profit function; and  $k$  is the amount of microcredit. To be eligible for income assistance, a household's earnings must satisfy the condition  $t[We + \Pi(s, k)] < g$  (see Meyer and Saupe (1970), as well as Hum and Simpson (1993)).

Income assistance programs do not acknowledge microenterprise losses in the benefit calculation rule. Profit,  $\Pi(s, k)$ , is ascribed the minimum value of \$0.00 for households who make a business loss during the benefit period. Therefore, while  $B \geq 0$  for all eligible households, those with negative earnings (i.e., loss) and those with zero earnings get the maximum amount  $g$ . This observation implies that under a single-period model, an IA recipient who would make a loss from self employment is better off not obtaining the micro credit loan because investing the loan would decrease the household's total income and leisure – and therefore, its utility. Total income  $Y$  for a household on IA is the sum of its benefits, paid wages, and microenterprise profit.

$$Y = g + (1 - t)[We + \Pi(s, k)] \quad (5.3)$$

Each household maximizes utility  $U(Y, l)$ , where  $l$  is time spent on leisure. By normalizing a household's total time to 1, its objective function can be stated as

$$\begin{aligned} \text{Max}_{e, s} \quad U &= U(g + (1 - t)[We + \Pi(s, k)], 1 - e - s) \end{aligned} \quad (5.4)$$

Denote the household as type-1 if it combines paid work with self-employment, and type-2 if it works in self-employment alone.<sup>1,2</sup> For a type-1 household, the first-order conditions

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<sup>1</sup>The assumption here is that the microenterprise profit is positive for the type-1, as well as the type-2 household since a negative profit implies no self employment under a single-period model. It will be seen in section 5.3 that a positive-profit assumption is not necessary under a multi-period model.

<sup>2</sup>The type-1 household is one engaged in pluriactivity. See Fuller (1990) and Olfert (1992) for discus-

for maximum utility are

$$U_Y(1-t)W - U_l = 0 \quad (5.5)$$

$$U_Y(1-t)\Pi_s - U_l = 0 \quad (5.6)$$

These give

$$(1-t)\Pi_s = (1-t)W = \frac{U_l}{U_Y} \quad (5.7)$$

The expression  $\Pi_s$  is the marginal profit from the microenterprise (that is additional profit generated by spending an additional unit of time in the microenterprise). The marginal profit from the microenterprise is assumed to be a decreasing function of the time allocation ( $s$ ). The expression  $U_Y$  denotes marginal utility of income;  $U_l$  is marginal utility of leisure. At the utility maximizing time allocations for the type-1 household, the microenterprise wage rate  $\Pi_s$  is equalized with the wage rate in paid work  $W$ . Also the effective wage rate  $(1-t)W$  equals the marginal rate of substitution of leisure for income  $\frac{U_l}{U_Y}$ .

For a type-2 household, equation 5.6 constitutes the only first-order condition. The condition implies equality between the microenterprise wage rate and the household's marginal rate of substitution of leisure for income.

$$(1-t)\Pi_s = \frac{U_l}{U_Y} \quad (5.8)$$

### 5.2.1 Disincentive Effect of IA under the Traditional Model

The amount of work disincentives from IA that is suggested by the single-period model depends on the earnings tax rate faced by the IA recipients. On the one hand, the model suggests that if  $t < 1$ , some households may invest the microcredit but decrease time allocation to work relative to a situation with no IA. On the other hand a case of complete nonadoption of the microcredit is suggested by the model under  $t = 1$ . Each of these cases is discussed below.

#### Decrease in Time Allocation to Work by Households Facing $t < 1$

Consider first the type-1 household. For all  $t < 1$ , equation 5.7 means  $\Pi_s = W$  at the utility maximizing allocation of time to the microenterprise.<sup>3</sup> This condition is as

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sions on pluriactivity as distinct from part-time self-employment. The 'pluriactor' works at least as much time in self-employment (full time) as other entrepreneurs who are engaged in self-employment alone, and also works additional hours on a paid job.

<sup>3</sup>Recall  $\Pi_s$  is non constant in time whereas  $W$  is. Hence, the household increases (or decreases)  $s$  until the needed equality is realized.







kinked for households whose tax scenario depends on their time allocation to work. The kink is illustrated at point  $z$  in figure 5.2. Given a kinked budget line, a household's choice between IA and no IA would depend on the position of its indifference curve as illustrated in figure 5.2.

The following analysis will assume that there are no kinks in households' budget lines. Figure 5.1 suggests that a type-1 household that decides to participate in an IA program would always decrease its time allocation to work. The marginal effect of the guaranteed benefit  $g$  on time allocation to work by a type-1 household can be found by totally differentiating (5.5) and (5.6) with respect to  $s$ ,  $e$  and  $g$ . This yields

$$\frac{ds_1}{dg} = 0 \quad (5.10)$$

$$\frac{de_1}{dg} = \frac{-WU_{YY}(1-t)}{U_{YY}(1-t)^2W^2 + U_{ll}} \leq 0 \quad (5.11)$$

Therefore, for a type-1 household, the work disincentive of an IA program with  $t < 1$  implies a reduction in time allocated to paid work while time allocated to the microenterprise remains unchanged.

For a type-2 household, a comparison of equations (4.6) and (5.8) shows the household decreases time allocation to the microenterprise as a consequence of IA. See proof in appendix. Figure 5.3 illustrates the disincentive effect of IA for a type-2 household. The household responds to IA by moving upward from the indifference curve through point  $b$  to the curve through point  $i$ . As a result, time allocation to the microenterprise decreases from  $s_2$  to  $s'_2$  while leisure increases from  $l_2$  to  $l'_2$ .

Totally differentiating (5.6) with respect to  $s$  and  $g$  gives the marginal effect of  $g$  on time allocation by the type-2 household.

$$\frac{ds_2}{dg} = \frac{-U_{YY}\Pi_s(1-t)}{U_{YY}(1-t)^2\Pi_s^2 + \Pi_{ss}U_Y(1-t) + U_{ll}} \leq 0 \quad (5.12)$$

An interesting case to consider is when microenterprise profits are taxed at a lesser rate than the tax rates on wage earnings. This is indeed the experience in some jurisdictions. For instance, the Microenterprise Tax Credit Act of Nebraska allocates \$2 million annually to provide tax credit for microentrepreneurs who expand their microenterprises. Such tax credits lower the effective tax rate on the microenterprise profits. If a lower tax rate on the microenterprise profits is assumed (say the tax rate on the microenterprise is  $t' < t$ , while the tax rate on wage earnings remains at  $t$ ), the budget line would become steeper in the region in which time is allocated to the microenterprise. A steeper budget line implies that more time would be allocated to the microenterprise by both the type-1 and the type-2 household.

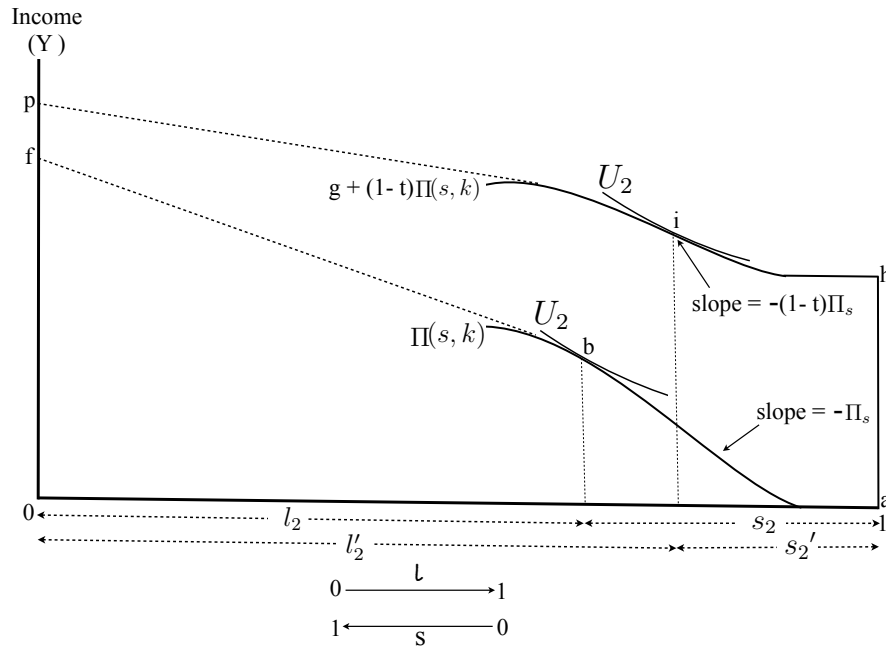


Figure 5.3: Effect of IA on Time Allocated to MC by a Type-2 Household ( $t < 1$ )

### Complete Nonadoption of MC by Households Facing $t = 1$

For  $t = 1$ , equations 5.7 and 5.8 give  $U_l/U_Y = 0$ , for the type-1 and type-2 household respectively. This condition occurs only at the corner ( $e = 0, s = 0, l = 1$ ). This is shown in figure 5.4. Utility is maximized at point h, and the maximized utility is  $U(g, 1)$ .

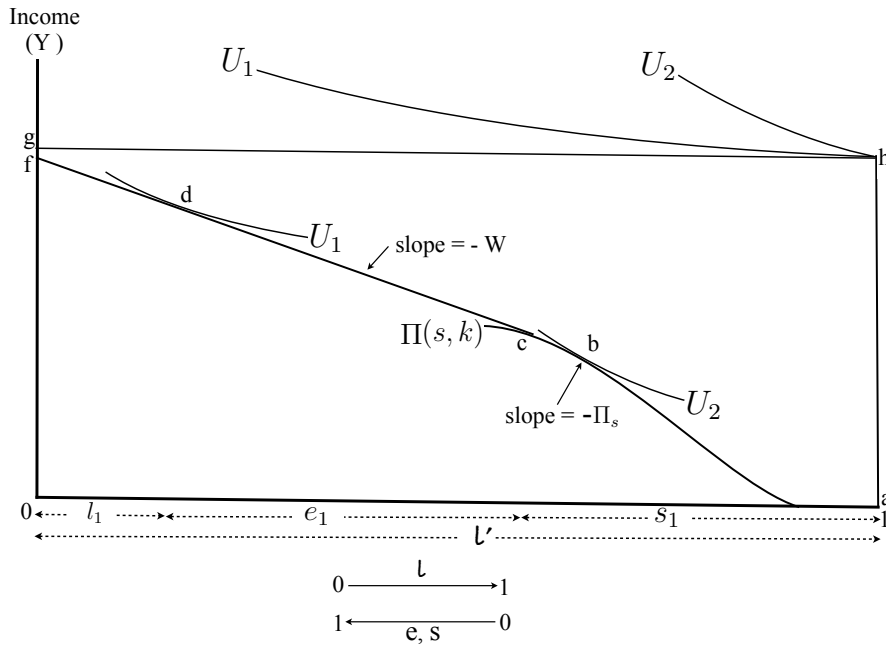


Figure 5.4: Effect of IA on Time Allocated to MC by Types 1 and 2 Households ( $t = 1$ )

Overall, the traditional model suggests that any household would decrease time allocation

to work as a consequence of IA. If the IA program applies a less than 100% tax rate on earnings, then both household types may obtain the microcredit loan in spite of IA. The type-1 household would decrease only time spent in paid work while time allocated to the microenterprise remains unchanged. The type-2 household on the other hand would reduce time allocation to the microenterprise. When faced with a 100% tax rate, both type-1 and type-2 households would prefer not to work and therefore would not obtain the microcredit loan.

As explained in the introductory part of this chapter, some IA recipients facing a 100% earnings tax rate have been observed to allocate time to microcredit. Participation in microcredit programs by such IA recipients may be explained by the sequential lending of microcredit. The next section applies the multi-period model developed in chapter 4 to explain the partial adoption of microcredit among IA recipients facing  $t = 1$ .

### 5.3 Explaining Partial Adoption of MC under $t=1$

Under the sequential lending attribute of microcredit, the maximum loan size available to a participating household increases with the number of loans it has successfully borrowed and repaid. A typical first-time borrower of a microcredit loan is eligible for only \$1,000. In subsequent applications to the program, the returning borrower is eligible for higher amounts up to the maximum specified by the program. The maximum amount ranges from \$5,000 to \$35,000 across the MC programs in the United States and Canada. Additionally, the credit histories accumulated during the period of participating in the microcredit program may facilitate the household's access to larger loans from conventional sources. Sequential lending, therefore, means an IA recipient who participates in the microcredit program in the current period may be able to access a larger loan at a future period. It follows that the adoption decisions by IA recipients can be analyzed by a multi-period model.

#### 5.3.1 The Multi-Period Model

Suppose an income assistance recipient lives in two periods. Assume for now that there are no program limits on the duration of assistance. Hence, the households may also receive IA in the future period. To keep the analysis simple, suppose the tax rate on the IA program is  $t = 1$ , there is no stigma from IA dependency, and the households have no intention to default on the MC program. The effect of sequential lending can be analyzed by assuming the first loan a household gets is  $\bar{k}$ , the next loan is  $2\bar{k}$  and  $y(\bar{k}) < g < y(2\bar{k})$ ,

where  $y(k) = We + \Pi(s, k)$  represents household earnings and  $g$  represents the guaranteed amount on the IA program. With  $t = 1$ , a household with a microcredit loan of amount  $\bar{k}$  will not allocate any time to paid work since the overall effect on current income would be zero (that is  $e = 0$  for  $k = \bar{k}$ ).<sup>5</sup>

Figure 5.5 shows a household's decision alternatives in each period along with their associated outcomes. A household that borrows  $\bar{k}$  in the current period is at node a. It may invest the loan on a microenterprise (node c), and generate some revenue before repaying the loan with interest. At node c, the household allocates time,  $s$ , to the microenterprise. It makes profit  $\Pi(s, \bar{k}) = Pf(s, \bar{k}) - R$  where  $f(s, \bar{k})$  is output,  $P$  is output price,  $Pf(s, \bar{k})$  is total revenue, and  $R = \bar{k} + r$  is repayment of loan  $\bar{k}$  and interest  $r$  to the lender. The household's total income is the microenterprise profit  $\Pi(s, \bar{k})$ , plus its IA benefit  $g - t\Pi(s, \bar{k})$ . With  $t = 1$  total income at this node is  $g$ . Therefore, the household gets utility  $V(g, 1 - s)$  for the period, where  $1 - s$  represents time spent on leisure.

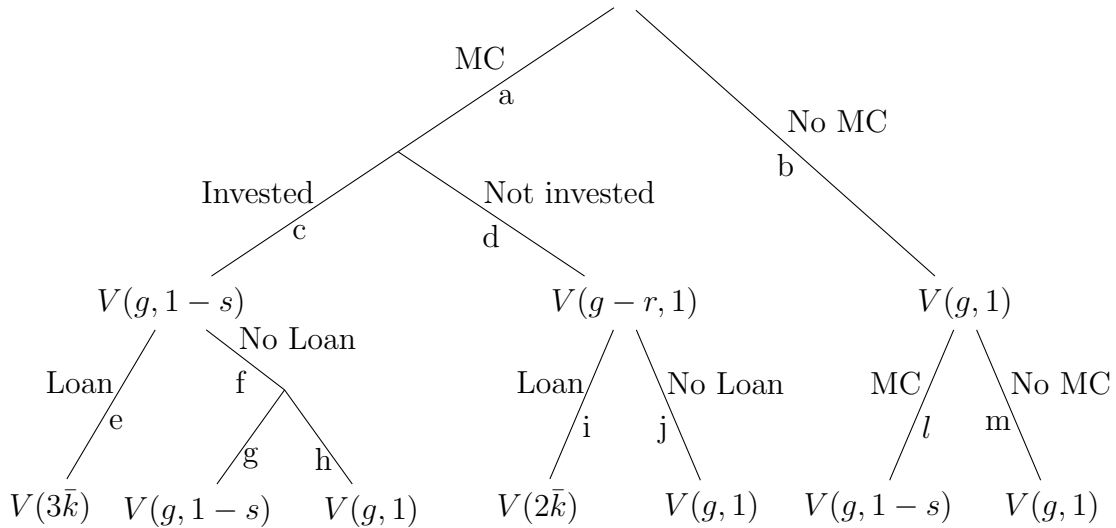


Figure 5.5: Decision Tree for IA Recipient Contemplating Participation in a Microcredit Program

On the other hand, the household may obtain the MC loan in the current period and repay it without ever making an investment (node d). In such a case, current borrowing is only a strategy for accessing the larger loan at a future period. At node d, the household allocates its entire time to leisure, and gets the guaranteed amount  $g$  in IA benefit. The income at its disposal is  $g - r$  and its maximum utility  $V(g - r, 1)$ .

As a third alternative, the household may decide not to borrow in the current period (node b). In such a case, its entire time would be allocated to leisure and its total income

<sup>5</sup>It is assumed that current income is the only motivation for paid work and that work experience would not have any impact on paid wages at a future date; this is mostly true for unskilled labour.

would be the guaranteed amount on the IA program. Its maximized utility for the period would be  $V(g, 1)$ .

Payoff in the second period depends on which one of the alternatives was adopted in the first. If the household had successfully participated in the microcredit program in the first period, it would be able to obtain a loan of amount  $2\bar{k}$  in the second. This may either be a “next loan” from the same MC program or a conventional form of business loan from other sources. However, given that this is the last period in the household’s lifetime, it would no longer borrow as a strategy for accessing future loans. Hence, it does not obtain any loans in the second period unless it intends to invest.

If the household had invested the microcredit in the first period, then by the beginning of period 2 it would already have business capital (equipment) worth  $\bar{k}$  dollars.<sup>6</sup> Therefore, if it borrows the next loan of  $2\bar{k}$  in the second period (node e), it has total capital of  $3\bar{k}$  and earnings  $y(3\bar{k}) > g$ . The earnings may be coming entirely from the microenterprise or it may include earnings from paid work. In either case,  $y(3\bar{k}) > g$  implies the household would not be eligible for IA in that period. Household utility at node e would be  $V[y(3\bar{k}), e^*, s^*, 1 - e^* - s^*]$  where  $e^*$  and  $s^*$  are utility maximizing allocations of time to paid work and the microenterprise respectively. To keep the notation compact, denote  $V[y(3\bar{k}), e^*, s^*, 1 - e^* - s^*]$  as  $V(3\bar{k})$ .

However, a household that invested the MC in the first period might not take a loan in the second (node f). It may continue in self-employment on its accumulated capital  $\bar{k}$  (node g). At this node, it continues to allocate  $s$  to the microenterprise with profit  $\Pi(s, \bar{k}) = Pf(s, \bar{k})$ . The household does not incur a cost on capital at this node (i.e.,  $R = 0$ ). If  $Pf(s, \bar{k}) < g$ , the household would still be eligible for income assistance, total income at this node would be the guaranteed IA benefit  $g$  and utility would be  $V(g, 1 - s)$ . On the other hand, if  $Pf(s, \bar{k}) > g$ , the household would break away from income assistance and may obtain higher levels of income and utility by taking up a wage job in addition to the self-employment. Assume the former case is what obtains at node g (i.e.,  $Pf(s, \bar{k}) < g$  and utility is  $V(g, 1 - s)$ ). The reader may wish to return here later, to verify that the main results of the model would not change if the latter case were assumed.

An IA recipient who invested the MC in the first period, may decide in the second period to relinquish self-employment altogether in which case it would rely fully on IA (node h). At this node, it gets utility  $V(g, 1)$ .

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<sup>6</sup>To simplify the analysis, assume the first loan was spent on the purchase of some business equipment and that there is no depreciation. Relaxing these assumptions will only complicate the model without changing the main results.

A household at node  $i$  gets  $2\bar{k}$  in loan by virtue of having participated in the microcredit program in the first period. However, it has no standing investment and no accumulated capital since it did not invest the first loan. It earns  $y(2\bar{k}) > g$  and its utility is  $V(2\bar{k})$ . Alternatively, this household may decide not to take a loan in the second period (node  $j$ ). It remains eligible for IA, getting  $g$  in total income and  $V(g, 1)$  in utility.

At node  $l$ , the household would be a first-time borrower since it did not participate in an MC program in the first period. Hence, it can only get the specified amount  $\bar{k}$  of MC. Its utility from investing the loan is  $V(g, 1 - s)$ . On the other hand, the household may again choose not to obtain the microcredit (node  $m$ ). Under this choice, it continues to rely on IA and to allocate all its time to leisure. Its maximized utility for the period remains at  $V(g, 1)$ .

Assume  $V(2\bar{k}) > V(g, 1)$ . In other words, the household would prefer a loan of size  $2\bar{k}$  to IA. By backward induction, the decision tree becomes as shown in figure 5.6 below.

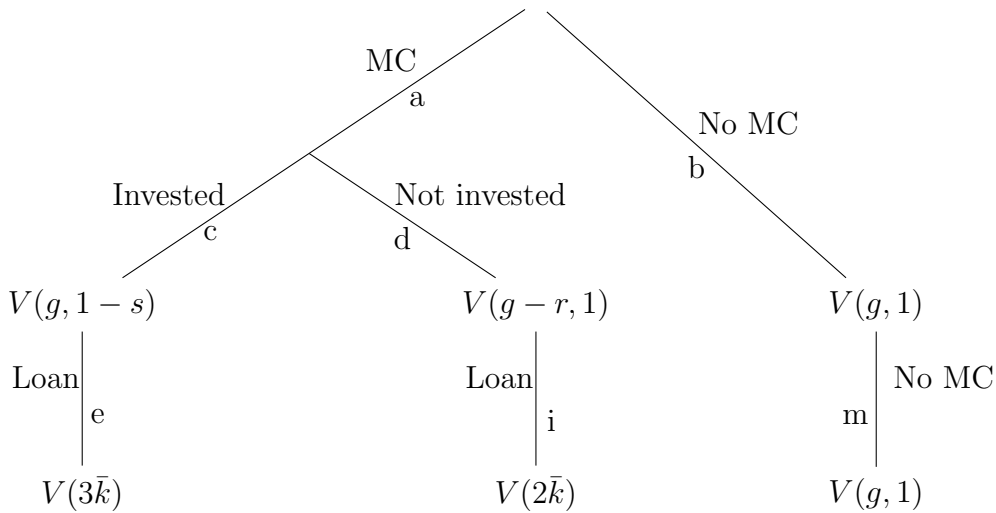


Figure 5.6: Possible Decision Alternatives after Backward Induction

Label path a–c–e with invested microcredit as IMC; path a–d–i with strategic borrowing as SMC. A household on either IMC or SMC is simultaneously participating in the IA and MC programs. Define path b–m with no microcredit as NMC. A household on NMC is participating only in the IA program. The maximum utilities on paths IMC, SMC and NMC are respectively

$$V_{IMC} = V(g, 1 - s) + \delta V(3\bar{k}) \quad (5.13)$$

$$V_{SMC} = V(g - r, 1) + \delta V(2\bar{k}) \quad (5.14)$$

$$V_{NMC} = V(g, 1) + \delta V(g, 1) \quad (5.15)$$

The parameter  $\delta$  is a household-specific discount factor (time preference rate).

$$\delta = \frac{1}{1 + \tau} \quad (5.16)$$

where  $\tau \geq 0$  is a household-specific discount rate. Therefore,  $\delta \in (0, 1)$  can be regarded as a differentiating characteristic of households. Suppose there is a discount factor  $\delta_A$  at which a household is indifferent between NMC and SMC, equating  $V_{NMC}$  with  $V_{SMC}$  gives

$$\delta_A = \frac{V(g, 1) - V(g - r, 1)}{V(2\bar{k}) - V(g, 1)} \quad (5.17)$$

Households with  $\delta < \delta_A$  would prefer to remain on only the IA program. Those with  $\delta > \delta_A$  would simultaneously participate in the IA and MC programs.

The numerator in equation 5.17 is the loss in current utility that a household would experience from borrowing the current microcredit for the strategic purpose of accessing a future loan. The denominator is the gain in utility that the household would experience at a future date from having engaged in strategic borrowing in the current period. It follows that  $\delta_A$  would fall within the feasible region of household discount factors ( $0 \leq \delta \leq 1$ ) only if the utility loss is no more than the utility gain. If the loss exceeds the gain, then  $\delta_A$  would exceed 1, meaning for all households,  $\delta$  would be less than  $\delta_A$ , and, therefore, no household would be willing to engage in strategic borrowing.

Suppose there is a discount factor  $\delta_B$  at which a household is indifferent between SMC and IMC, equating  $V_{SMC}$  with  $V_{IMC}$  gives

$$\delta_B = \frac{V(g - r, 1) - V(g, 1 - s)}{V(3\bar{k}) - V(2\bar{k})} \quad (5.18)$$

Households with  $\delta_A < \delta < \delta_B$  would engage in strategic borrowing while those with  $\delta > \delta_B$  would invest the microcredit.

Again,  $\delta_B$  would exceed 1 if the numerator of 5.18 exceeds its denominator. In other words, the current utility loss from making the investment rather than strategic borrowing would exceed the future gain. If such happens, no IA recipient would invest the loan since  $\delta \leq 1$  for all households.

Figure 5.7 illustrates the payoffs for a case where both  $\delta_A$  and  $\delta_B$  fall within the feasible region of household  $\delta$ . That is the case for  $0 < \delta_A < \delta_B < 1$ . This results in partial adoption of the microcredit loan  $\bar{k}$  among IA recipients. Households with  $0 \leq \delta \leq \delta_A$  would not adopt the microcredit, those with  $\delta_A < \delta < \delta_B$  would engage in strategic borrowing, while those with  $\delta > \delta_B$  would invest the microcredit.

The results here indicate a household facing a 100% earnings tax rate on the IA program may not always opt out of the microcredit program. If the benefits from a next loan are

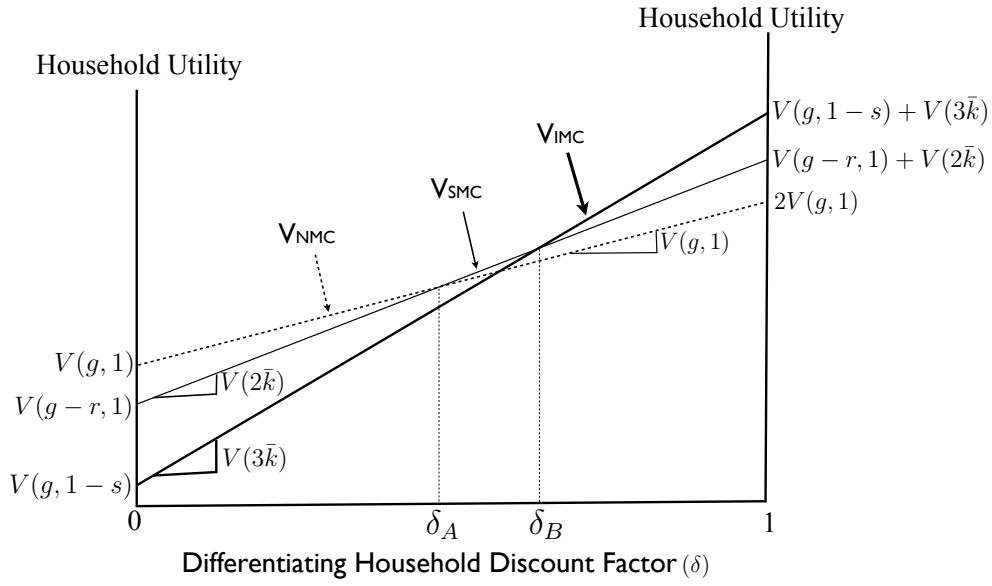


Figure 5.7: Household Discount Factor and Simultaneous Use of IA and MC

higher than those from IA, a household with a high discount factor may obtain and invest the microcredit loan on some self-employment activity. It does so knowing that its action would not change its current total income from the basic guaranteed amount on the IA program. Its action is a strategic means of accessing the next loan which would be bigger than the current microcredit. The results also indicate that it is possible for households to adopt the strategy of borrowing but not investing the microcredit, just so that they become eligible for larger loans in the future. In such a case, the household incurs the interest and transaction costs of accessing the current microcredit, while maintaining its short-run total dependence on income assistance. However,, the likelihood that the household would adopt such a strategy disappears with increased cost of borrowing (both the intercept and the slope of  $V_{SMC}$  decreases, leading to an increase in  $\delta_A$ ). IA recipients who prefer not to obtain the microcredit are those with a low discount factor.

### 5.3.2 Effect of Specific Variables of the IA Policy

#### Earnings Tax Rate

Although the analysis has been carried out for  $t = 1$ , it is straightforward to infer the results for the case  $t < 1$ . At a less than 100% earnings tax rate, not all of the earnings from a microenterprise would be clawed back from the guaranteed amount  $g$ . Hence, a household's participation in the microcredit program would result in an increase in its total income in the short run. The incentive for an IA recipient to participate in a microcredit program would arise both from the potential long-term effects, as well as the



short-term effect on total incomes. The slope of line  $V_{SMC}$  in figure 5.7 would increase resulting in a decrease in  $\delta_A$ . Both the intercept and slope of line  $V_{IMC}$  would increase resulting in a decrease in  $\delta_B$ . Therefore, any IA recipient who participates in a microcredit program at  $t = 1$  would also participate in the program if  $t < 1$ . Some IA recipients who did not participate in a microcredit program at  $t = 1$  would participate at  $t < 1$ . In other words, a decrease (an increase) in the earnings tax rate results in the self-selection of more IA recipients into (out of) the microcredit program.

### Duration of Eligibility for Assistance

The above multi-period model has assumed a time invariant eligibility for income assistance. However,, duration of assistance is often temporary for many households. Assuming benefits would be terminated at the end of the first period, in the second period the household would either have to rely on microcredit, or on paid employment, or both. The maximum payoffs along path  $V_{IMC}$  and  $V_{SMC}$  are unaffected, but the second-period payoff in path  $V_{NMC}$  would be less than  $V(g, 1)$ .<sup>7</sup> In figure 5.7, the slope of  $V_{NMC}$  would decrease and consequently  $\delta_A$  would decrease. Therefore, with a temporary duration of assistance, more households would participate in microcredit programs even at a 100% tax rate on their IA benefits. Households facing an imminent termination of their IA benefit are more likely to participate in microcredit programs than those on longer term or permanent assistance.

### Guaranteed Benefit

The marginal effect of  $g$  on the proportion of IA recipients who adopt microcredit can be understood from its marginal effect on  $\delta_A$  and  $\delta_B$ . Using equation 5.17, the marginal effect of  $g$  on  $\delta_A$  is estimated as

$$\frac{d\delta_A}{dg} = \frac{V_Y(g) - V_Y(g - r) + V_Y(g)\delta_A}{V(2\bar{k}) - V(g, 1)} \quad (5.19)$$

The parameters  $V_Y(g)$  and  $V_Y(g - r)$  denote marginal utility of income evaluated at  $g$  and  $g - r$  respectively for the utility function in which the household allocates its entire time to leisure (i.e.,  $V(Y, 1)$ ). With leisure held constant, the marginal utilities of income at income levels  $g$  and  $g - r$  are shown in the first panel of figure 5.8. It is obvious that  $V_Y(g - r) > V_Y(g)$ , hence, the sign on equation 5.19 is not immediately obvious. Notice, however, that the sign on (5.19) would be same as that of its numerator. Thus,

---

<sup>7</sup>Along path  $V_{NMC}$ , the household gets a maximum of  $\bar{k}$  in MC in the second period. Earnings  $y(\bar{k}) = We + \Pi(s, k)$  is less than  $g$  which is why the household is on income assistance in the first place.

substituting the expression for  $\delta_A$  (equation 5.17) into the numerator of (5.19) gives  $d\delta_A/dg > 0$  if

$$V(2\bar{k}) < \frac{V_Y(g)[V(g, 1) - V(g - r, 1)]}{V_Y(g - r) - V_Y(g)} + V(g, 1) \quad (5.20)$$

Notice that both sides of the inequality in (5.20) are positive. The inequality would hold if the future loan,  $2\bar{k}$ , anticipated from current microcredit participation is small. Equation 5.20, therefore, indicates that  $d\delta_A/dg > 0$  if the anticipated future loan is small. That is to say, an increase in  $g$  will increase the proportion of IA recipients who self-select out of the microcredit program if the future loan anticipated from current participation is small.

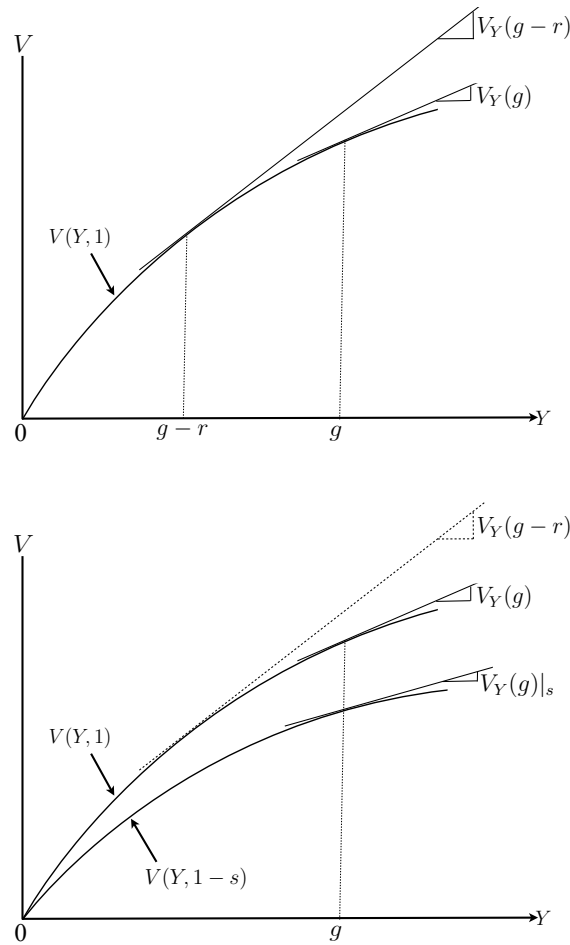


Figure 5.8: Marginal Utility of Income ( $V_Y$ ) Evaluated at  $g$ ,  $g-r$  and  $(g)|_s$

The marginal effect of  $g$  on  $\delta_B$  is found using (5.18).

$$\frac{d\delta_B}{dg} = \frac{V_Y(g-r) - V_Y(g)|_s}{V(3\bar{k}) - V(2\bar{k})} \quad (5.21)$$

The parameter  $V_Y(g)|_s$  denotes marginal utility of income evaluated at  $g$  for the utility function in which the household allocates time  $s$  to the microenterprise. The function

$V(Y, 1 - s)$ , as well as the marginal utility  $V_Y(g)|_s$ , are shown in the second panel of figure 5.8. Notice that  $V_Y(g - r) > V_Y(g) > V_Y(g)|_s$ . Hence, (5.21) is easily signed,  $\frac{d\delta_B}{dg} > 0$ .

The main finding here is that an increase in guaranteed benefits results in more households self-selecting out of the MC program and fewer households investing the microcredit loan.

## 5.4 Summary

This chapter analyzed how households who receive income assistance benefits allocate their time to microcredit. The analysis indicates that the single-period labour-leisure model may overstate the disincentive for microcredit that is generated by IA programs. The single-period model suggests that IA recipients faced with a 100% earnings tax rate should self-select out of the microcredit program. In contrast, empirical evidence suggests a partial adoption of microcredit among IA recipients facing the 100% tax rate.

The analysis in this chapter has shown that a multi-period utility maximization framework is more appropriate for explaining the use of microcredit by IA recipients. Under the sequential lending attribute of microcredit, an IA recipient who uses the microcredit loan in the current period may get future access to a larger loan by which he or she can increase future earnings above the IA eligibility limit. At a less than 100% earnings tax rate, current participation in the MC program is motivated by its anticipated effect on both current and future period incomes. At a 100% tax rate, current participation in the MC program is motivated by its future effect on the household's income. The likelihood of participation in the microcredit program is an increasing function of the household's discount factor. This likelihood is negatively influenced by the guaranteed amount of IA benefit, the earnings tax rate, and the duration of eligibility for income assistance.

## 5.5 Appendix

### 5.5.1 Formal Proof that $s_2^a < s_2^n$

Let  $s_2^a$  be the time allocated to a microenterprise by a type-2 household with income assistance. Let  $s_2^n$  be the time allocation with no income assistance. Then the optimality condition with income assistance equation 5.8 may be written as

$$(1 - t)\Pi_s(s_2^a) = \frac{U_l^a}{U_Y^a} \quad (5.22)$$

while the corresponding condition with no income assistance equation 4.6 is

$$\Pi_s(s_2^n) = \frac{U_l^n}{U_Y^n} \quad (5.23)$$

It is true that  $Y^a \geq Y^n$ , otherwise the household would not participate in the income assistance program. Thus,  $U_Y^a \leq U_Y^n$ .

### Proof by contradiction

Suppose  $s_2^a = s_2^n$ . Then  $\Pi_s(s_2^a) = \Pi_s(s_2^n)$ . And

$$(1 - t)\Pi_s(s_2^a) < \Pi_s(s_2^n) \quad \forall 0 < t \leq 1 \quad (5.24)$$

Also by  $s_2^a = s_2^n$ , we have  $1 - s_2^a = 1 - s_2^n$  which implies  $l_2^a = l_2^n$  and therefore  $U_l^a = U_l^n$ . It follows that

$$\frac{U_l^a}{U_Y^a} \geq \frac{U_l^n}{U_Y^n} \quad \text{given} \quad U_Y^a \leq U_Y^n \quad (5.25)$$

But comparing with equations 5.22 and 5.23, the condition in 5.25 implies

$$(1 - t)\Pi_s(s_2^a) \geq \Pi_s(s_2^n) \quad (5.26)$$

This is a contradiction with equation 5.24. Hence,, it is not possible that  $s_2^a = s_2^n$ .

Now suppose  $s_2^a > s_2^n$ . Then  $\Pi_s(s_2^a) < \Pi_s(s_2^n)$  given the assumption of a decreasing returns to scale.<sup>8</sup> It follows that

$$(1 - t)\Pi_s(s_2^a) < \Pi_s(s_2^n) \quad \forall 0 < t \leq 1 \quad (5.27)$$

And by  $s_2^a > s_2^n$ , we get  $1 - s_2^a < 1 - s_2^n$  implying  $l_2^a < l_2^n$ . Thus,  $U_l^a > U_l^n$ . Therefore,

$$\frac{U_l^a}{U_Y^a} \geq \frac{U_l^n}{U_Y^n} \quad \text{given} \quad U_Y^a \leq U_Y^n \quad (5.28)$$

Again, when compared with equations 5.22 and 5.23, the condition in 5.28 implies

$$(1 - t)\Pi_s(s_2^a) \geq \Pi_s(s_2^n) \quad (5.29)$$

which is a contradiction of 5.27. Hence, it is not possible that  $s_2^a > s_2^n$ .

It has been proved by contradiction that the cases  $s_2^a \geq s_2^n$  are not possible. Therefore, it must be the case that  $s_2^a < s_2^n$ . The consistency of this can actually be checked very quickly.  $s_2^a < s_2^n$  implies  $\Pi_s(s_2^a) > \Pi_s(s_2^n)$ . Hence,

$\exists$  some  $t \in (0, 1]$  s.t

$$(1 - t)\Pi_s(s_2^a) > \Pi_s(s_2^n) \quad (5.30)$$

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<sup>8</sup>With increasing returns to scale, the solution would be at the corner (i.e., s=1 for household type-1 and s=0 for type-2) and the results would not be affected by the provision of income assistance at  $t < 1$ .

And for  $s_2^a < s_2^n$ , it is found that  $1 - s_2^a > 1 - s_2^n$ , which means  $U_l^a < U_l^n$  and therefore  $\exists$  some  $(U_Y^a, U_Y^n)$  s.t.

$$\frac{U_l^a}{U_Y^a} \geq \frac{U_l^n}{U_Y^n} \quad \text{given} \quad U_Y^a \leq U_Y^n \quad (5.31)$$

This is consistent with the condition in 5.30. Thus, the time allocated to self-employment by a type-2 household is less in the case with income assistance than in the case with no income assistance.

## Chapter 6

# Substituting Microcredit for Income Assistance

### 6.1 Introduction

The preceding analysis 5 shows that time allocation by IA recipients using a microcredit loan is affected by both the guaranteed amount of IA benefit and the size of the microcredit loan. The marginal effects of microcredit and income assistance on a household's time allocation mix, imply some marginal effects on the household's current income and utilities. In this chapter, some of the equations generated in the time allocation analysis for income assistance recipients, are exploited in comparing the marginal effects of MC and IA on the household's incomes and utilities.

The marginal effect of IA benefits on household incomes has received considerable attention in economic theory. This effect is at the heart of the efficiency-equality argument with social transfer programs. The programs seek to improve on income equality by redistributing income from high to low-income households. Since Okun (1975), it has been known that an efficiency loss arises from such programs because each dollar in transfer to a household as IA benefit results in less than a dollar increase in the household's income. The loss in efficiency prompted Okun's description of such a redistribution program as a "leaky bucket" — a phrase which has become widely used by economists discussing income assistance. Okun explains that the efficiency loss (leakage) arises partly because of the administrative costs of IA programs and partly because of the work disincentive created by income assistance. The receiving household decreases time allocation to work such that a fraction of the benefit received is offset by a decrease in earnings.

The 1996 reform in the United States, and subsequent reforms by different provincial authorities in Canada, included the imposition of time limits on the duration of eligibility for assistance, a reduction in guaranteed benefits, and the tightening of employment obligations for IA recipients (Fuller et al., 2008; Jones-DeWeever et al., 2003). These

reforms aimed to encourage work by recipients, reduce the growth rate of IA caseloads, and reduce public expenditure on the programs (Stewart and Dooley, 1999; Fuller et al., 2008; Moffitt, 2002). There is an ongoing shift in emphasis from welfare to “workfare”, with IA programs now also involved in job placement for recipients. In the words of Wallace et al., 2006 (P. 27), regarding the reform in British Columbia, Canada, “the Ministry is very clear that these policy changes are an attempt to redesign welfare ‘from a culture of entitlement to a culture of employment and self sufficiency.’”

In the midst of the debates and policy reforms to IA, there has been increased attention to microcredit in the United States and Canada (Morduch, 1999). Advocates claim that the needed transition of IA recipients to self-sufficiency can be achieved by further social policy reform to ease their access to microcredit for self-employment (Raheim, 1997; Snow, 1999; Stoesz and Saunders, 1999; Klein et al., 2003). Past studies of MC usage among IA recipients have concluded that households experience an increase in earnings from their use of a MC loan (Wehrell, 2002, Klein et al., 2003).<sup>1</sup> Therefore, as an alternative to income assistance, microcredit could be adopted as a social policy to assist low-income households in setting up a microenterprise with a view to achieving the needed reduction in income inequality. If the social cost of microcredit is smaller than that of income assistance, then substituting microcredit for income assistance would mitigate the loss in efficiency that has made social policy a highly controversial subject.

This chapter considers a policy reform that grants households a microcredit loan in exchange for a decrease in income assistance. The marginal effects of income assistance and microcredit on household income, as well as on household utilities are analyzed and compared. The analysis seeks to estimate how many dollars in microcredit an IA recipient would have to receive in exchange for a dollar of income assistance without causing a decrease in the household’s total income or in its utility. Implications for policy reform are discussed.

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<sup>1</sup>The impact of microcredit on the earnings of IA recipients cannot be generalized as the impact of microcredit programs. Schreiner (1999) and Servon, 1997 report that a higher proportion of MC users are not eligible for IA, and have higher incomes, better skills, and better education. The impact assessment for this group of households is mixed. Some studies report that these households experience a short-fall in current earnings when they self-select into microcredit programs (Spalter-Roth et al., 1994; Sanders, 2002). Other studies report that the households experience growth in income over time (Burrus, 2005; Clark and Kays, 1999).

## 6.2 The Model

The first-order conditions derived in equations (5.5) and (5.6) may be totally differentiated with respect to  $e$ ,  $s$  and  $k$  to get the marginal effect of microcredit on time allocation by a type-1 household as

$$\frac{ds_1}{dk} = -\frac{\Pi_{sk}}{\Pi_{ss}} \geq 0 \quad (6.1)$$

$$\frac{de_1}{dk} = \frac{\Pi_{sk}(U_{YY}(1-t)^2W^2 + U_{ll}) - U_{YY}(1-t)^2W\Pi_k\Pi_{ss}}{\Pi_{ss}[U_{YY}(1-t)^2W^2 + U_{ll}]} \leq 0 \quad (6.2)$$

Similarly, totally differentiating the first-order condition 5.6 with respect to  $s$  and  $k$  yields the marginal effect of microcredit on time allocation to the microenterprise by a type-2 household.

$$\frac{ds_2}{dk} = -\frac{U_{YY}(1-t)^2\Pi_s\Pi_k + (1-t)\Pi_{sk}U_Y}{U_{YY}(1-t)^2\Pi_s^2 + (1-t)\Pi_{ss}U_Y + U_{ll}} \quad (6.3)$$

On the basis of equations 6.1 through 6.3, as well as equations 5.10 through 5.12, the income equation (5.3) for an IA recipient may be respecified with both  $e$  and  $s$  expressed as functions of the microcredit loan  $k$  and the guaranteed IA amount  $g$ . That is

$$Y = g + (1-t)[We(g, k) + \Pi(s(g, k), k)] \quad (6.4)$$

The household's utility is

$$U = U[Y(g, k, t), 1 - e(g, k, t) - s(g, k, t)] \quad (6.5)$$

Assume for now that the IA program applies a less than 100% earnings deduction rate (i.e.,  $t < 1$ ) — the case for  $t = 1$  will be discussed later. Suppose there is a policy reform which stipulates that eligible IA recipients be given a microcredit loan in exchange for a decrease in the guaranteed amount  $g$ .<sup>2</sup> With the tax rate held constant, total change in each household's income would be the sum of the partial changes with respect to  $k$  and  $g$

$$dY = \frac{\partial Y}{\partial g} dg + \frac{\partial Y}{\partial k} dk \quad (6.6)$$

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<sup>2</sup>The policy may not be applied on all households currently receiving income assistance. For instance those classified as unable to work due to disability or other reasons would be excluded from such a policy.



### 6.2.1 Marginal Effect of $g$ on Households' Incomes

The partial effect of  $g$  on each household's income can be estimated from (6.4) using the time allocation effects;  $ds_1/dg$  and  $de_1/dg$  for a type-1 household and  $ds_2/dg$  for a type-2 household as derived in (5.10) through (5.12). These give  $\partial Y_1/\partial g$  and  $\partial Y_2/\partial g$  for the type-1 and type-2 household respectively.

$$\frac{\partial Y_1}{\partial g} = \frac{U_u}{U_{YY}(1-t)^2W^2 + U_u}, \quad 0 \leq \frac{dY_1}{dg} < 1 \quad (6.7)$$

$$\frac{\partial Y_2}{\partial g} = \frac{U_Y\Pi_{ss}(1-t) + U_u}{U_Y\Pi_{ss}(1-t) + U_u + U_{YY}(1-t)^2\Pi_s^2}, \quad 0 \leq \frac{dY_2}{dg} < 1 \quad (6.8)$$

These partial effects represent the marginal effect of  $g$  on income, holding all other factors constant. Notice that the effects as shown in (6.7) and (6.8) are less than 1. Therefore, the estimates are consistent with Okun's theory of the "leaky bucket." Equations 6.7 and 6.8 show that a dollar decrease in  $g$  would (holding  $k$  constant) decrease each household's income by less than a dollar. The result occurs because the household would respond by increasing time allocation to work, such that a part of the income lost due to the decrease in  $g$  is regained from work.

### 6.2.2 Marginal Effect of $k$ on Households' Incomes

The partial effect of  $k$  on each household's income can be estimated from (6.4) using the time allocation effects  $ds_1/dk$  and  $de_1/dk$  for a type-1 household and  $ds_2/dk$  for a type-2 household.

These give  $\partial Y_1/\partial k$  and  $\partial Y_2/\partial k$  for the type-1 and type-2 households respectively.

$$\frac{\partial Y_1}{\partial k} = \frac{(1-t)\Pi_k U_u}{U_{YY}(1-t)^2W^2 + U_u} \geq 0 \quad (6.9)$$

The partial effect for a type-2 household is

$$\frac{\partial Y_2}{\partial k} = (1-t)[\Pi_s \frac{\partial s}{\partial k} + \Pi_k] \quad (6.10)$$

where  $\partial s/\partial k$  is as given in equation 6.3. Solving 6.10 completely would give.

$$\frac{\partial Y_2}{\partial k} = \frac{(1-t)\Pi_k(U_Y\Pi_{ss}(1-t) + U_u) - U_Y\Pi_s\Pi_{sk}(1-t)^2}{U_Y\Pi_{ss}(1-t) + U_u + U_{YY}(1-t)^2\Pi_s^2} \geq 0 \quad (6.11)$$

Equations 6.9 and 6.11 are the marginal effects of capital on income, holding all other factors constant. The equations show that the marginal impact of capital on income is nonnegative for both household types. If  $\Pi_k > 0$ , then an increase in  $k$  would increase the household's earnings. If the earnings are still below the eligibility limit for IA, then given  $t < 1$  only a fraction of the additional earnings would be clawed back from the household's IA benefit. Therefore, the increase in earnings would outweigh the loss in benefit and the household's total income would increase. For IA recipients with earnings at the margin of eligibility, a marginal increase in  $k$  may increase earnings beyond the IA eligibility limit. Households at such a margin would no longer face a tax rate (i.e.,  $t = 0$ ). Substituting  $t = 0$  into equations 6.9 and 6.11 leaves the direction of the inequalities unaffected for a household at the margin.

### 6.2.3 A Suggestion on the Minimum Rate of Substituting $k$ for $g$

The marginal effects in (6.7) through (6.11) may now be used to derive the minimum rate at which  $k$  must be substituted for  $g$  if the change in household income must be nonnegative. By using (6.7) and (6.9) in (6.6) for the type-1 household, the condition yielding  $dY_1 \geq 0$  is found as

$$dY_1 \geq 0 \quad \text{if} \quad dk \geq -\frac{1}{(1-t)\Pi_k} dg \quad (6.12)$$

For a policy that reduces  $g$  (i.e.,  $dg < 0$ ), the right-most term in (6.12) is positive. The condition in 6.12 shows that the minimum rate of substitution depends on the marginal value product of capital  $\Pi_k$ . If  $\Pi_k$  is equal to the inverse of the earnings exemption rate ( $\frac{1}{1-t}$ ) on the IA program, then the minimum rate of substitution of microcredit for income assistance is 1. If  $\Pi_k$  is less than  $\frac{1}{1-t}$ , the minimum substitution rate is greater than 1 (that is a dollar decrease in  $g$  should be followed by more than a dollar increase in  $k$  to a type-1 household). If  $\Pi_k$  is greater than  $\frac{1}{1-t}$ , the minimum substitution rate is less than 1 (that is a dollar decrease in  $g$  could be followed by less than a dollar increase in  $k$  without causing a decrease in the income of a type-1 household).

For a type-2 household, substituting (6.8) and (6.11) into (6.6) gives

$$dY_2 \geq 0 \quad \text{if} \quad dk \geq -\frac{U_Y \Pi_{ss}(1-t) + U_l}{(1-t)\Pi_k(U_Y \Pi_{ss}(1-t) + U_l) - U_Y \Pi_s \Pi_{sk}(1-t)^2} dg \quad (6.13)$$

The right-most term in 6.13 is positive for  $dg < 0$ . Comparing the inverse of the term in (6.13) with the corresponding term in (6.12) would reveal that for a type-1 and a type-2 household with an equivalent  $\Pi_k$ , the prescribed minimum rate of substitution of  $k$  for  $g$  is greater for the type-1 than for the type-2 household. The type-1 household has a higher

preference for income and therefore a higher utility loss from a decrease in  $g$ . Therefore, the type-1 household desires a higher compensation with  $k$ .

This section concludes with the following summary. If the marginal value product of capital is greater than the inverse of the earnings exemption rate on an IA program, then for each household type, each dollar decrease in IA could be followed by less than a dollar increase in microcredit without causing a decrease in the household's income. If the marginal value product of capital is less than the inverse of the earnings exemption rate, then a dollar decrease in IA must be followed by more than a dollar increase in MC to the household in pluriactivity. However, the household in self-employment alone may still get less than a dollar increase in MC without causing any decrease in its income. At an extremely low marginal value product of capital, both types of households would require more than a dollar increase in microcredit as compensation for each dollar decrease in income assistance.

### 6.3 Marginal Effects of $k$ and $g$ on Utilities

Analysis in the preceding section has assumed that the goal of social policy is to increase incomes among low-income households. If the goal is instead to increase the households' utilities, then the impact of the proposed reform on household utilities would be a more appropriate consideration than the impact on incomes. The change in utility resulting from the substitution of microcredit for income assistance is

$$dU = \frac{\partial U}{\partial g} dg + \frac{\partial U}{\partial k} dk \quad (6.14)$$

The partial effects for a type-1 household are

$$\frac{\partial U_1}{\partial g} = \frac{U_Y U_u + U_l W U_{YY}(1-t)}{U_{YY}(1-t)^2 W^2 + U_u} \geq 0 \quad (6.15)$$

$$\frac{\partial U_1}{\partial k} = (1-t)\Pi_k \frac{U_Y U_u + U_l W U_{YY}(1-t)}{U_{YY}(1-t)^2 W^2 + U_u} \geq 0 \quad (6.16)$$

Using 6.15 and 6.16 in 6.14 gives

$$dU_1 \geq 0 \quad \text{if} \quad dk \geq -\frac{1}{(1-t)\Pi_k} dg \quad (6.17)$$

Comparing between the conditions in 6.17 and 6.12 shows that for a type-1 household a substitution rate that does not decrease income will also not decrease the household's utility.

For the type-2 household, the partial effects of  $g$  and  $k$  are

$$\frac{\partial U_2}{\partial g} = U_Y \left[ 1 + (1-t)\Pi_s \frac{\partial s_2}{\partial g} \right] - U_l \frac{\partial s_2}{\partial g} \quad (6.18)$$

$$\frac{\partial U_2}{\partial k} = U_Y(1-t) \left[ \Pi_s \frac{\partial s_2}{\partial k} + \Pi_k \right] - U_l \frac{\partial s_2}{\partial k} \quad (6.19)$$

Recall from the first-order condition (equation 5.6) that  $U_Y(1-t)\Pi_s - U_l = 0$ . Therefore,  $\partial U_2 / \partial g = U_Y$  and  $\partial U_2 / \partial k = U_Y(1-t)\Pi_k$ . Thus, equation 6.14 yields

$$dU_2 \geq 0 \quad \text{if} \quad dk \geq -\frac{1}{(1-t)\Pi_k} dg \quad (6.20)$$

For ( $dg < 0$ ) the right-most term in 6.20 is greater than the corresponding term in 6.13. Therefore, for a type-2 household, a higher substitution rate is required to keep utility from decreasing, than that which is required to keep income from decreasing. In other words, a substitution rate that does not decrease income may decrease the household's utility. This result occurs because the type-2 household prefers leisure to income. Therefore, a substitution of  $k$  for  $g$  that increases the household's income but reallocates its time away from leisure may result in a decrease in utility. This situation is illustrated in figure 6.1.

Within the figure, the indifference curve labelled  $U_2$  represents utility to a type-2 IA recipient before the substitution of microcredit for income assistance. The household receives a guaranteed benefit  $g$  and has a microenterprise profit function  $f$ . The household allocates  $s_2$  to the microenterprise and  $l_2$  to leisure. Total income is  $Y_2$ . With the substitution of  $k$  for  $g$ , the guaranteed amount is decreased to  $g'$  (i.e.,  $dg = g' - g < 0$ ). Microenterprise capital increase by  $dk$  and therefore the slope of the microenterprise profit function increases (i.e.,  $f'$  has a larger slope than  $f$ ). Time allocated to the microenterprise increase to  $s'_2$  and leisure decreases to  $l'_2$ . Income increases to  $Y'_2$  while utility decreases to  $U'_2$ .

The main result in this section is that a substitution rate that does not decrease income of the type-1 IA recipient will also not decrease its utility whereas a substitution rate that does not decrease income of the type-2 IA recipient may decrease its utility. These results imply that households with a higher preference for income obtain greater utility from microcredit than those with a higher preference for leisure. The results also imply that households with a higher preference for leisure obtain greater utility from income assistance than they do from microcredit.

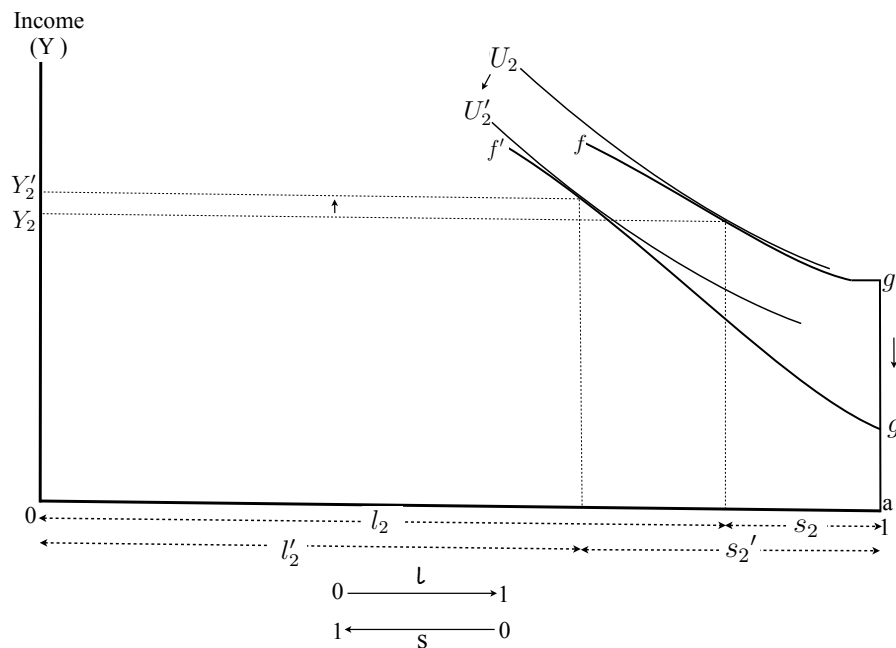


Figure 6.1: Decrease in Current Utility for a Type-2 Household from a Substitution of  $k$  for  $g$

#### 6.4 Special Case with $t = 1$

The analyses in chapter 5 showed that under a 100% earnings tax rate, time allocation to a microenterprise by an IA recipient is zero if the household's utility maximization is over a single period, but may be positive for households maximizing utility over multiple periods. Equation 6.4 shows that irrespective of the household's choice of time allocation under  $t = 1$ , its current income would be  $Y = g$ . By implication, although an increase in  $k$  may increase the earnings of households who decide (or are made) to work, the effect of this additional  $k$  on income would be zero as long as the earnings is below the IA eligibility limit (the "break away" point). If the effect of additional microcredit on income is to be positive, then the additional microcredit ( $dk$ ) must be large enough to make the household's earnings greater than the break away point on the IA program. This is the only means  $k$  can be substituted for  $g$  under  $t = 1$  without causing a decrease in the household's income. Given the initial  $g$  on the IA program, a break-away inducing amount of microcredit must be allocated to the household as a complete replacement for IA.

Given  $t = 1$ , the prescribed break-away inducing amount of microcredit  $dk$  depends on the household's initial level of earnings relative to the IA eligibility limit. For a household with marginal earnings (i.e., those with earnings just below the break away point),  $dk$  would be small. On the other hand,  $dk$  would be large for households with less than

marginal earnings (i.e., those with earnings far below the break away point).

## **6.5 Summary**

This chapter has considered the possibility of a policy reform to substitute microcredit for income assistance without causing a decrease in the incomes and utilities of affected households. The rate of substitution depends on the prevailing tax rate on the IA program. At  $t = 1$ , only a complete replacement of  $g$  with a break-away inducing  $k$  would ensure that the impact on household incomes is nonnegative. On the other hand, a partial replacement of  $g$  with  $k$  can be achieved at  $t < 1$  without causing a decrease in the household income. Additionally, the recommended rate of substitution of  $k$  for  $g$ , given  $t < 1$ , depends on the household type, and is inversely related to the household's marginal value product of capital. While a substitution rate that does not decrease income for a type-1 household would also not decrease its utility, a substitution rate that does not decrease income of a type-2 household may decrease its utility.

## Chapter 7

### Summary, Conclusions, Policy Implications, and Suggestions for Further Study

This research was motivated by empirical evidence that time allocation to work by microcredit borrowers in the United States and Canada runs contrary to the traditional model of household time allocation between paid work and self-employment. Developed by Becker (1965) and Gronau (1977), the traditional model suggests that households will allocate time to a microenterprise, only if the microenterprise profit function rises above the paid wage line. In contrast, observation of some microcredit participants reveals they allocate time to microenterprises for which the profit function lies below the paid wage line. As part of this dissertation, some interviews were carried out in November 2008 with seven borrowers on the microcredit program of Vancity Credit Union in Vancouver. The interviews revealed that some households are willing to self-select into the microcredit program and to invest the microcredit loans, in spite of anticipating a lower return from their microenterprises than from their paid jobs.

Additionally, for households who receive income assistance benefits, the traditional model suggests that those facing a 100% earnings tax rate on the IA program would prefer to allocate all their time to leisure. In contrast, some IA recipients facing a 100% earnings tax rate have been observed to also participate in MC programs, in which case they allocate some time to self-employment.

The inadequacy of the traditional model in explaining time allocation among microcredit participants can be attributed to the sequential lending attribute of microcredit. Under the sequential lending arrangement, a household's use of microcredit in the current period facilitates its access to a larger loan at a future period. The time allocation decision of microcredit participants can be modelled as a multi-period utility maximization problem. In this regard, the traditional model is limited to the extent that it assumes that households maximize utility over a single period.

The purpose of this dissertation therefore was (1) to develop a two-period model in explaining time allocation by households who are eligible for microcredit in the United States and Canada, and (2) to apply the model in explaining self-selection into microcredit programs among income assistance recipients who face a 100% earnings tax rate on the IA program. The analysis in chapter 4 develops the basic model of time allocation by households that are eligible for microcredit. The analysis in chapter 5 applies the basic model in explaining microcredit participation among IA recipients.

The analyses of time allocation by income assistance recipients produced a set of equations for comparing between the marginal effects of income assistance and microcredit on household incomes and utilities. This comparison is at the heart of ongoing proposals to replace income assistance with microcredit in a bid to reduce public spending on IA while encouraging work among recipients. Based on the marginal effects of IA and MC, the analyses in chapter 6 was aimed at suggesting the minimum rate of substituting microcredit for income assistance such that affected households do not experience a short-fall in their incomes and utilities.

Following is a summary of the research findings and the conclusions that can be drawn from the results. Some policy implications of the findings are also discussed.

## **7.1 Summary and Conclusions**

The models assumed that households are heterogeneous with respect to their relative preference for income and leisure. Two types of households were assumed. The type-1 household has a high relative preference for income, while the type-2 household has a high relative preference for leisure. Each household has a reservation utility, — the utility it would derive if no time were allocated to participating in the microcredit program. The reservation utility derives from leisure and paid earnings for households that are non IA recipients. For IA recipients facing a less than 100% earnings tax rate, the reservation utility derives from leisure, IA benefit, and paid earnings. For IA recipients facing a 100% tax rate, no time is allocated to paid work and therefore, the reservation utility derives from leisure and IA benefit alone.

Each household also faces a utility from investing the microcredit loan. Conditional on investing the microcredit loan, the type-1 household may engage in pluriactivity — having both paid work and the microenterprise — at a time allocation mix such that the marginal profit from the microenterprise equals the paid wage rate. A type-2 household which invests the microcredit loan would relinquish paid work and allocate time only to leisure



and the microenterprise. With an increase in the size of microcredit, a type-1 household would increase time allocation to the microenterprise and reduce leisure, while a type-2 household would reduce time allocation to the microenterprise and increase leisure. For both types of households, the marginal effect of microcredit on utility is positive.

Because microcredit loans are small, the current-period utility from participating in the MC program may be less than the current-period reservation utility. But with sequential lending, a current-period participant gets access to a larger loan in the future and utility with that loan may increase beyond the reservation utility. A household's net present value of utilities is the sum of its current and future period utilities, adjusted by the household's discount factor. Each household self-selects into the microcredit program only if the net present value of its utility with microcredit exceeds the net present value of its reservation utility.

The net present value of utilities is an increasing function of the household discount factor. Households are differentiated according to their discount factors. Households with high discount factors are more likely to desire the future benefit of current participation in a microcredit program and are, therefore, more likely to self-select into the microcredit program than households with low discount factors. Therefore, the partial adoption of microcredit among eligible households in the United States and Canada could be explained in part by the distribution of household discount factors.

One of the interesting results of the model is that some households — in a bid to access the future loan — may obtain microcredit in the current period and repay it without having invested it in a microenterprise. Such action was referred to as “strategic borrowing” in this dissertation. Households which engage in strategic borrowing are those for which the net present benefit from strategic borrowing exceeds the net present benefit from non borrowing as well as the net present benefit from investing the microcredit loan. With other factors remaining constant, strategic borrowers have discount factors that are higher than those of non borrowers but lower than those of investors.

The size of future loans that households anticipate from current borrowing has an increasing effect on anticipated benefits of microcredit and, therefore, an increasing effect on the fraction of eligible households who self-select into the microcredit program. Additionally, an increase in a household's productivity in self-employment results in an increase in its anticipated benefit and therefore an increase in its likelihood of self selecting into the microcredit program. On the other hand, the cost of borrowing has a decreasing effect on anticipated benefit and therefore a decreasing effect on a household's likelihood of using microcredit. Also, an increase in the wage rate in paid employment would increase the

reservation utility for households and, therefore, decrease the households' likelihood of participating in a microcredit program.

Among income assistance recipients, those facing a 100% earnings tax rate do not allocate time to paid work because their entire earnings would be clawed back from their guaranteed benefit, leaving them with no change in total income. If the household obtains microcredit and allocates time to a microenterprise, its utility would decrease because leisure would decrease and total income would not change under the 100% earnings tax rate. However, in the future period, the household would get a larger loan by virtue of its past period's participation in the microcredit program. The loan could be large enough to generate profits beyond the IA eligibility point. In such a case, the household would break away from IA, total income would increase, and utility might increase to the point of offsetting any utility loss incurred in the preceding period. Therefore, an IA recipient facing a 100% earnings tax rate may obtain microcredit and allocate time to a microenterprise in order to access larger capital that it anticipates would induce a break away from the IA program.

At a less than 100% earnings tax rate, not all of the earnings from a microenterprise would be clawed back from the guaranteed benefit. The household's participation in a microcredit program would result in an increase in its total income in the short run. As well, the household would get access to a larger loan in the future period. Thus, for IA recipients who face a tax rate of less than 100%, the incentive to participate in microcredit programs arises both from the potential long-term effects as well as the short-term effect on total incomes.

Specific variables of the IA policy were found to affect households' self-selection into the microcredit program. The earnings tax rate, the guaranteed benefit, and the duration of eligibility for assistance all have a decreasing effect on the fraction of IA recipients who participate in microcredit programs.

For each household, total income is affected by the household's time allocation response to income assistance as well as to microcredit. Comparison between the marginal effects of income assistance and microcredit revealed the minimum rates of replacing income assistance with microcredit that would ensure that households do not experience a decrease in income. For an IA recipient facing a 100% tax rate, only a complete replacement of income assistance with a break-away-inducing amount of microcredit would ensure that the household's income does not decrease. For an IA recipient facing a less than 100% tax rate, partial substitution of microcredit for income assistance may be made at a prescribed minimum rate. The prescribed minimum rate is a positive function of the earnings tax

rate on the prevailing IA program. The prescribed minimum rate is a negative function of the household's preference for leisure and its marginal value product of capital.

If the marginal value product of capital is greater than the inverse of the earnings exemption rate on the IA program, then for each household type, each dollar decrease in IA could be followed by less than a dollar increase in microcredit without causing a decrease in the household's income. If the marginal value product of capital is less than the inverse of the earnings exemption rate, then a dollar decrease in IA must be followed by more than a dollar increase in MC to the household in pluriactivity. However, the household in self-employment alone may still get less than a dollar increase in MC without causing any decrease in its income. At an extremely low marginal value product of capital, both types of households would require more than a dollar increase in microcredit to compensate for each dollar decrease in income assistance. A substitution rate that does not decrease income for the pluriactive IA recipient will also not decrease its utility, whereas a substitution rate that does not decrease income for the IA recipient working in self-employment alone may decrease its utility.

## **7.2 Policy Implication**

Public and private agencies in the United States and Canada have continued to grapple with ways of improving the socio-economic conditions of low-income households. The ability of microcredit programs to bring about the needed improvement has often been criticized by opponents who claim that the loans are too small to make any significant positive impact on household income. The multi-period model developed in this dissertation implies that the social value of microcredit programs goes beyond their immediate impact on household incomes. In spite of a non significant impact on current incomes, society's expenditure on MC programs could be justified if there are known long-term positive effects on the incomes of participants. The long-term effect of microcredit participation has so far not been given any attention in empirical studies.

This dissertation reported that microcredit programs are yet to reach a sustainable scale, and that cost recovery has remained low even among the best programs in Canada and the United States. Part of the problem is a low rate of program participation coupled with the loss of loans to borrowers who default on repayment. This research revealed that the desire to build a credit score and access future loans provides an incentive for program participation and for loan repayment among participants. The incentive effect of sequential borrowing could be exploited by microcredit programs with a view to increasing the participation rate and repayment rate on the programs. For instance, an increase in

the rate of access to future loans by virtue of past MC participation would increase both the participation rate and the repayment rate on the programs. The rate of access to future loans could be increased by expanding the number of loans available to households that have successfully participated in a microcredit program.

Latest IA reforms in both Canada and the United States have sought to motivate work among low-income households by tightening IA eligibility requirements and implementing active job placement for recipients. Results of the time allocation model suggests that irrespective of their continued eligibility for IA, households who can exercise agency will, on their own, self-select into microcredit programs if the anticipated benefit from owning a microenterprise is high enough. Factors which increase the anticipated benefits from having a microenterprise will increase the rate of self-selection into microcredit programs. One such factor is the household's productivity in a microenterprise. Public investment in self-employment training programs for income assistance recipients may pay off in the long run because it would increase the household's anticipated productivity in the microenterprise. More households would self-select into the MC program and ultimately relinquish part or all of their IA benefits.

A society's choice between microcredit and income assistance as social policy must be based on the goal of such policy, as well as the private preference for income and leisure among affected households. Although the goals of increasing household incomes and utility may appear complementary, the policy alternatives of microcredit and income assistance differ in the extent to which they can meet each goal. Therefore, a trade-off between microcredit and income assistance may result in a trade-off between income and utility among affected households. Households with higher preference for income obtain greater utility from microcredit than those with higher preference for leisure. And households with higher preference for leisure obtain greater utility from income assistance than they do from microcredit. The social welfare effect of income assistance may outweigh the effect of microcredit if the private preferences for leisure exceed the preferences for income. On the other hand, the social welfare effect of microcredit could outweigh the effect of income assistance if private preferences are higher for income than for leisure. A careful consideration of both social and private preferences is necessary in designing a socially optimal mix of microcredit and income assistance.

### **7.3 Suggestions for Further Study**

This study has employed theoretical analyses in explaining household time allocation to microcredit. The analyses provide the basis for some empirical estimation. First, a number

of factors that influence a household's participation in a microcredit program have been identified in this study. The factors include the financial and transaction costs of obtaining the loans, the size of anticipated future loans, the household's relative preference between income and leisure, its wage in paid employment, its degree of risk aversion, and its rate of time preference. Among households that are eligible for income assistance, the guaranteed benefit, tax rate and duration of eligibility are also influential in determining whether or not the household participates in the microcredit program. Each of these factors enters into a participation equation which can be estimated using data from participants and eligible nonparticipants of microcredit programs. The estimation will reveal the statistical significance of each of these factors in influencing microcredit participation among eligible households.

Second, the theoretical analyses have revealed that the parameters  $\Pi_k$  and  $\Pi_s$  are important to the household deciding on the use of microcredit, as well as to the policy analyst interested in substituting microcredit for income assistance. While  $\Pi_k$  refers to the marginal returns to capital in the microenterprise,  $\Pi_s$  denotes the marginal returns to time in the microenterprise (i.e., the microenterprise wage rate). The actual values of these parameters may be derived from empirical estimation of a microenterprise profit equation using data from microentrepreneurs in the United States and Canada who may be participants or nonparticipants in microcredit programs. Such analysis would also produce an estimate of the effect of microcredit on microenterprise profit. Further, the study may be expanded to include data of households' total incomes in order to estimate the effect of microcredit on household incomes.

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